VPDES PERMIT PROGRAM FACT SHEET

This document gives the pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a **major industrial** permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq. The discharge results from the operation of a water treatment plant. Discharges to outfall 001 consists of filter backwash and continuous monitoring water. This permit action consists of revising the effluent limitations for total recoverable copper, increasing the monitoring frequency for total suspended solids, increasing the monitoring frequency for whole effluent toxicity, and updating the special conditions.
(SIC Code: 4941 Potable Water Supply)

1. **Facility Name and Address:**
   Falling Creek Water Filtration Plant
   601 Jefferson Street, Suite 200
   Roanoke, VA 24011
   Location: 3031 Laurel Glen Road, Bedford County

2. **Permit No. VA0001465** Existing Permit Expiration Date: August 27, 2009

3. **Owner Contact:** Name: Delmar Irving Title: Water Production Superintendent
   Telephone No: (540) 265-0586

4. **Application Complete Date:** February 27, 2009
   Permit Drafted By: Becky L. France Date: April 28, 2009
   DEQ Regional Office: Blue Ridge Regional Office
   Reviewer: Kip D. Foster, Water Permit Manager
   Reviewer's Signature: _____ Date: 4/29/09
   Public Comment Period Dates: From _____ to _____

5. **Receiving Stream Classification:**

Receiving Stream:	Falling Creek (River Mile: 7.7)		
Watershed ID:	VAW-L0R		
River Basin:	Roanoke River		
River Subbasin:	Roanoke River		
Section:	6a		
Class:	III		
Special Standards:	NEW-1		
7-Day, 10-Year Low Flow:	0 MGD	7-Day, 10-Year High Flow:	0 MGD
1-Day, 10-Year Low Flow:	0 MGD	1-Day, 10-Year High Flow:	0 MGD
30-Day, 5-Year Low Flow:	0 MGD	Harmonic Mean Flow:	0 MGD
Tidal:	No	303(d) Listed:	No

Attachment A contains a copy of the flow frequency determination memorandum.

6. **Operator License Requirements:** None

7. **Reliability Class:** NA

8. **Permit Characterization**:

(X)	Private	( )	Interim Limits in Other Document
( )	Federal	( )	Possible Interstate Effect
( )	State		
( )	POTW		
( )	PVOTW		

9. **Treatment Provided:** A description of the wastewater treatment system is provided below. See **Attachment B** for the water flow diagrams and **Attachment C** for the site visit report. **Table I** below includes the treatment units and flow associated with the discharge.

Table I
DISCHARGE DESCRIPTION

Outfall Number	Discharge Source	Treatment (Unit by Unit)	Flow (Max 30-day Average) (MGD)
001	Falling Creek Water Filtration Plant	2 lagoons (series)	0.100

Falling Creek Water Filtration Plant treats and distributes potable water to Vinton, Stewartsville, portions of Bedford County, and parts of southeast Roanoke City. This treatment facility began operation in 1929, and in 1989 was upgraded from a direct filtration system to a conventional package system. A valve was also added to the berm between the two lagoons. Water is withdrawn from Falling Creek Reservoir. As needed, copper sulfate has been added to Falling Creek Reservoir. According to facility staff, copper sulfate has been added to the reservoir since 1973 or 1974.

The treatment system consists of two parallel treatment trains each with two-stage flocculation chamber, settling chamber, and multimedia filtration chamber. Potassium permanganate and sodium hydroxide are added below the dam at the intake structure. Chlorine gas and fluoride are added to the line coming into the treatment process. Alum and polymer are also added except during periods of cold water temperature operation when polyaluminum hydroxychlorosulfate (PAC) may be used as the coagulant.

Following chemical addition, the water is split between two parallel baffled flocculation basins. Then, the water proceeds to one of two sedimentation basins where the bulk of the solids are removed. The sedimentation basins contain tube settler modules. After the sedimentation basins, the water passes through two parallel mixed media rapid sand filters prior to entering a clearwell. The filter beds consist of anthracite, sand, and gravel. Filtered water is transferred from the wetwell under the treatment units to a 50,000 gallon clearwell. Sodium hydroxide,

gaseous chlorine, and zinc orthophosphate may be added to the clearwell prior to gravity flow to the Parkway storage tank for distribution.

Wastewater is generated from backwash water. Wastewater is also generated by the continuous stream of potable water involved in the monitoring operations (pH and turbidity) at the water treatment plant. Sludge is collected in the tubes and wasted at each filter backwash. Sodium bisulfite powder is manually added to backwash water as it leaves the filter to remove chlorine. Process water from these operations flows into two clay-lined lagoons that are operated in series. Settled solids are removed from the lagoons periodically. Facility staff anticipates removing solids late this spring when the facility is taken off line to facilitate dam repair. The second lagoon discharges to Falling Creek.

10. **Sewage Sludge Use or Disposal:** Domestic sewage sludge is not produced at this facility.

11. **Discharge Location Description:** The USGS topographic map which indicate the discharge location, any significant dischargers, any water intakes, and other items of interest is included in **Attachment D**. The latitude and longitude of the discharge are N $37^0 17' 59''$ and E $79^0 50' 13''$, respectively.

Name of Topo: Stewartsville Number: 109D

12. **Material Storage:** Alum, chlorine, copper sulfate, diesel, sodium bisulfite, sodium fluoride, sodium hydroxide, polymer, propane, and PAC are stored onsite. Miscellaneous laboratory reagents and other maintenance chemicals are also stored onsite. The following chemicals were observed at the water treatment facility.

alum, liquid tote tanks, 3,000 gallon storage tank
chlorine gas, 3 (150 pound) compressed gas cylinders (up to 15 cylinders kept onsite)
copper sulfate, 26 (50 pound bags)
sodium bisulfite, (liquid) 55 gallon drum
sodium fluoride, 30 (55 pound) bags, transferred to 50 gallon mixer tank
sodium hydroxide, 2,000 gallon tank, transferred to 40 gallon heated day tank
polymer, (CAT FLOC-TL) diallydimethylammonium chloride, 100 gallon tank
(PAC) polyaluminum hydroxychlorosulfate (liquid), 3 (55 gallon plastic drums), transferred to 300 gallon tank
propane tanks, 2 (AST)
diesel tank, 1 (AST) (bermed)

13. **Ambient Water Quality Information:** Memoranda or other information which helped to develop permit conditions (special water quality studies, STORET data, and any other biological and/or chemical data, etc.) are listed below.

The facility discharges into a section of Falling Creek that is designated on the Stewartsville topographic map as intermittent. Falling Creek becomes perennial prior to the confluence with the Roanoke River. For the purpose of determining antidegradation baselines for the perennial stream, flow frequencies were also determined for the perennial stream. See **Attachment A** for a copy of the flow frequency memorandum.

Chemical monitoring data for the perennial section have been collected on a tributary to the Roanoke River which is downstream from the confluence of Falling Creek with the Roanoke River. The STORET station, 4ABDA003.63, is located off Route 757 on Beaverdam Creek. The 90th percentile pH and temperature values were derived from data collected from September 2004 to May 2009. The average hardness was also derived from data collected in 2008 above the outfall. **Attachment E** contains this STORET data.

Falling Creek Water Filter Plant has one outfall which is Falling Creek in the Roanoke River/Smith Mountain Lake/ Beaverdam Creek Watershed (VAW-L07R) as described in the 2004 Integrated Water Quality Assessment (**Attachment E**).

The natural heritage resources of concern associated with this segment of Falling Creek include Roanoke logperch. The Roanoke logperch is classified as endangered by the Virginia Department of Game and Inland Fisheries (VDGIF) and the US Fish and Wildlife Service (USFWS). The Roanoke logperch is listed as a federal endangered species and its presence has been documented in the designated river section. A copy of the Division of Natural Heritage report information and the VDGIF information on species of concern in the area of the discharge is included in **Attachment E**.

14. **Antidegradation Review and Comments**: Tier I _____ Tier II __X___ Tier III _____

The State Water Control Board's Water Quality Standards include an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier I or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier II water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier II waters is not allowed without an evaluation of the economic and social impacts. Tier III water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with Tier determination. Falling Creek is not listed as a public water supply in the segment where the discharge is located. This segment of Falling Creek (VAW-L07R) is not listed on Part I of the 303(d) list for exceedances of water quality criteria. At the point of discharge the receiving stream is considered an intermittent stream and thus cannot reasonably be expected to support the designated uses specified in the water quality standards. Therefore, the receiving stream at the point of discharge is classified as a Tier I water.

At the point where Falling Creek becomes perennial a Tier designation is also needed. Since there are no data to indicate otherwise, the perennial section of Falling Creek has been classified as a Tier II water.

For purposes of aquatic life protection in Tier II waters, "significant degradation" means that no more than 25 percent of the difference between the acute and chronic aquatic criteria values and the existing quality (unused assimilative capacity) may be allocated. For purposes of human health protection, "significant degradation" means that no more than 10 percent of the difference between the human health criteria and the existing quality (unused assimilative capacity) may be allocated. The antidegradation baseline for aquatic life and human health are calculated for each pollutant as follows:

Antidegradation baseline (aquatic life) = 0.25 (WQS – existing quality) + existing quality

Antidegradation baseline (human health) = 0.10 (WQS – existing quality) + existing quality

Where:
"WQS" = Numeric criterion listed in 9 VAC 25-260-5 et seq. for the parameter analyzed
"Existing quality" = Concentration of the parameter being analyzed in the receiving stream

Falling Creek Water Filtration Plant was built in 1929 prior to the antidegradation policy requirements set forth in the Clean Water Act. These requirements apply to existing uses attained after November 28, 1975. Therefore, antidegradation baselines only apply if the facility has expanded or significantly increased the discharge. The 1999 reissuance application indicated a 30-day maximum flow of 0.123 MGD while the 1994 reissuance application indicated a 30-day maximum flow of 0.029 MGD. This increase in flow continued with the 2004 reissuance application which gave a 30-day maximum flow of 0.134 MGD. Antidegradation baselines are needed for this increase in flow noted on the 1999 reissuance application.

Stream and effluent data used in the antidegradation wasteload spreadsheet calculations are included in **Attachment E** and **Attachment F**, respectively. The 90th percentile pH and temperature and average hardness values for this perennial segment of Falling Creek are based on STORET data from Station 4ABDA003.63 located on a tributary downstream from the discharge point. The 90th percentile effluent temperature was based upon raw intake data.

The "existing" background concentrations for all parameters, except copper, were set to zero. Copper sulfate was being added to the reservoir prior to November 28, 1975. Therefore, the "existing" background copper concentration in the perennial section includes the effluent copper concentration at the time the antidegradation policy went into effect. This concentration has been estimated using dissolved copper data from 2002 through 2005 and the 30-day maximum flow from the 1994 reissuance application (prior to the increase in flow). The expected copper value from the STATS program output was used as the effluent dissolved copper concentration to determine the instream effluent concentration prior to the increase in flow. This effluent copper concentration, 1994 30-day maximum flow of 0.029 MGD, and the current stream flows were used to calculate the background instream copper concentration prior to the increase in effluent

flow. Antidegradation baselines have been calculated for this facility as described above and are included in **Attachment G.**

When applied, these antidegradation baselines become the new water quality criteria for this Tier II water. Effluent limits in this permit have been written to maintain the antidegradation baselines for each pollutant. The permit limits are in compliance with antidegradation requirements set forth in 9 VAC 25-260-30.

15. **Site Inspection:** Date: 03/25/09 Performed by: Becky L. France
Attachment C contains a copy of the site visit report. The last technical / laboratory inspection was conducted by Troy Nipper on December 22, 2005. A copy of the inspection report is found in the DEQ inspection file.

16. **Effluent Screening and Limitation Development:** DEQ Guidance Memorandum 00-2011 was used in developing all water quality based limits pursuant to water quality standards (9 VAC 25-260-5 et seq). Effluent data used in the calculation of the 90th percentile value for temperature, pH, and hardness are included in **Attachment F.** Refer to **Attachment G** for the wasteload allocation spreadsheets and effluent limit calculations. See **Table II** on pages 14-15 for a summary of effluent limits and monitoring requirements.

A. **Mixing Zone**

The facility discharges into a section of Falling Creek that is designated on the Stewartsville topographic map as intermittent. A mixing zone was not applicable to determining toxic limitations in the intermittent section. For the purpose of determining antidegradation baselines for the perennial section, the Agency mixing zone program, MIXER, was run to determine the percentage of the receiving stream flow that could be used in the antidegradation wasteload allocation calculations. The program indicated that 98.81 percent of the 1Q10 and 100 percent of the 7Q10 may be used for calculating the antidegradation acute and chronic wasteload allocations (AWLAs). A copy of the printout from the MIXER run is enclosed in **Attachment G.**

B. **Technology Based Limits and Monitoring**

Flow -- Flow is to be estimated once per month. This sample type is unchanged from the previous permit and is in accordance with the VPDES Permit Manual for water treatment plants.

pH -- Since the finished water is pH adjusted, limitations for pH are included in the permit. The pH limits of 6.0 S.U. minimum and 9.0 S.U. maximum are required. These limits are based upon the water quality criteria in 9 VAC 25-260-50 for Class III receiving waters. Monthly monitoring using grab samples is in accordance with the sampling guidelines in the VPDES Permit Manual for water treatment plants and has been continued from the previous permit.

Total Suspended Solids (TSS) -- The Best Professional Judgement (BPJ) limits of 30 mg/L monthly average and 60 mg/L daily maximum are consistent with the VPDES Permit Manual recommendations for water treatment plants. These BPJ limits are based upon technology available to meet these limits. Monthly monitoring using composite samples is recommended in the VPDES Permit Manual for water treatment plants. The composite sample is an 8-hour composite consisting of grab samples collected at hourly intervals until the discharge ceases or until a minimum of five grab samples have been collected. The permittee has been issued letters of noncompliance and so they no longer qualify for reduced monitoring. Therefore, the monitoring frequency has been revised to 1/month in accordance with the VPDES Permit Manual.

C. **Water Quality Based Limits and Monitoring**: In addition to the standard limitations for water treatment plants, the discharge must be evaluated to determine whether there is a reasonable potential for the effluent to violate the water quality standards (WQSs) adopted by the State Water Control Board (9 VAC 25-260 et. seq). Toxic pollutant data submitted with the application and during the permit term were above the quantification levels for chloroform and copper.

In accordance with DEQ Advice Memorandum dated January 10, 2001, human health parameters are assumed to be distributed similarly to other parameters and have the same relative variance (C.V. of 0.6). The chloroform concentration of 14.9 µg/L is well below the wasteload allocations. Therefore, effluent limitations will not be needed for this parameter.

Total Residual Chlorine (TRC) -- Since chlorine is added to the raw water, effluent limitations are needed. The TRC limits in the previous permit were reassessed with revised AWLAs to determine if more stringent limits are needed. Based on the acute and chronic AWLAs and the Agency's STATS program, permit limits of 0.016 mg/L monthly average and daily maximum are needed. See **Attachment G** for the AWLA spreadsheet and STATS program output. To avoid backsliding prohibitions, the previous permit limits of 0.015 mg/L for the monthly average and daily maximum have been carried forward from the previous permit. Monitoring shall continue at once per month via grab samples.

Copper, Total Recoverable -- Since the last reissuance, additional hardness data for the stream and the effluent have been collected. So, the AWLAs for copper were recalculated. Dissolved copper data to force a limit and the most stringent acute and chronic wasteload allocations (WLA or AWLA) were used as input in the Agency's STATS program. The STATS program output indicated that total recoverable copper limits of 3.6 µg/L monthly average and 3.6 µg/L daily maximum are needed. These limits are more stringent than the current limits of 3.9 µg/L monthly average and 3.9 µg/L daily maximum. So, a four-year schedule of compliance has been included to allow the permittee time to meet the more stringent total recoverable copper limitations.

Whole Effluent Toxicity (WET) Limit -- The chronic whole effluent toxicity (WET) limit of 1.44 TU_c will be continued from the previous permit. See **Attachment H** for the WET Limit Determination Memorandum and a summary of the whole effluent toxicity testing conducted during the current permit term.

For outfall 001, the facility has data for nine valid toxicity testing events. The facility passed all four of the chronic toxicity tests using C. dubia. The facility failed two of the five of the chronic toxicity tests for P. promelas. Since toxicity was associated with P. promelas rather than C. dubia, chronic testing will no longer be required for C. dubia. The chronic limit of 1.44 TU_c shall be continued from the previous permit. The monitoring frequency will increase to 1/quarter in accordance with the recommended frequency in the VPDES Permit Manual.

Calculations for the current chronic toxicity limit are included in the attached information. The chronic data for each species were input into the WETLIM10 spreadsheet to calculate a wasteload allocation. The chronic toxicity test data were entered into the STATS program along with the chronic wasteload allocation. The calculated limit was converted to an NOEC ($100/TU_c$), and then rounded up to the nearest whole number. Each TU_c was back calculated from the rounded NOEC (100/NOEC). In accordance with Agency guidance, the limit has been expressed with two decimal places. See **Attachment H** for a memorandum describing the test results and limitation calculations completed in the previous permit term.

17. **Antibacksliding Statement:** No limits are less stringent than the previous permit, and therefore the permit limits comply with the antibacksliding requirements of 9 VAC 25-31-220 L of the VPDES Permit Regulation.

18. **Compliance Schedule:** In accordance with 9 VAC 25-31-250 A3, a compliance schedule has been added to the permit as Part I.B to allow the permittee four years to comply with the more stringent total recoverable copper limitations.

19. **Special Conditions:** A brief rationale for each special condition contained in the permit is given below.

A. **Schedule of Compliance (Part I.B)**

Rationale: In accordance with 9 VAC 25-31-250 A3, a schedule of compliance has been added to allow the permittee time to meet the more stringent total recoverable copper limitations.

B. **Compliance Reporting under Part I.A (Part I.C.1)**

Rationale: In accordance with VPDES Permit Regulation, 9 VAC 25-31-190 J4 and 220 I, DEQ is authorized to establish monitoring methods and procedures to compile and analyze data on water quality, as per 40 CFR Part 130, Water Quality Planning and

Management, Subpart 130.4. This condition is necessary when toxic pollutants are monitored by the permittee and a maximum level of quantification and/or specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. This condition also establishes protocols for calculation of reported values.

C. **Notification Levels (Part I.C.2)**

Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 A for all industrial permits for manufacturing, mining, commercial, and silvicultural dischargers. This special condition requires that a permittee notify the DEQ of any changes in effluent quality or the presence of certain pollutants in the effluent.

D. **Operations and Maintenance Manual Requirement (Part I.C.3)**

Rationale: The Code of Virginia Section 62.1-44.16, VPDES Permit Regulation, 9 VAC 25-31-190 E, and 40 CFR 122.41(e) require proper operation and maintenance of the permitted facility. Section 40 of the Clean Water Act requires the permittee to provide an opportunity for the State to review the operations of the treatment facility. Compliance with an approved manual ensures these requirements are met.

E. **Materials Handling/Storage (Part I.C.4)**

Rationale: 9 VAC 25-30-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. The Code of Virginia § 62.1-44.16 and 62.1-44.17 authorized the Board to regulate the discharge of industrial waste or other waste. State Water Control Law § 62.1-44.18:2 authorizes the Board to prohibit any waste discharge that would threaten public health or safety, interfere with or be incompatible with treatment works or water use.

F. **Nutrient Enriched Waters Reopener (Part I.C.5)**

Rationale: In accordance with 9 VAC 25-260-350, the receiving stream has been designated nutrient enriched. 9 VAC 25-40-10, et seq., Policy for Nutrient Enriched Waters, allows reopening of the permit if total phosphorus and total nitrogen in a discharge potentially exceed specified concentrations. The VPDES permit application indicated that nitrogen and phosphorus are not believed present in the discharge. This condition is included in the permit to enhance the Board's ability to regulate discharges of nutrients into water designated as nutrient enriched in the Board's Policy of Nutrient Enriched Waters. The policy also anticipates that future nutrient limits may be needed to control aquatic plants.

G. **Total Maximum Daily Load (TMDL) Reopener (Part I.C.6)**

Rationale: Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under Section 303 of the Act.

H. **Whole Effluent Toxicity (WET) Limitation and Monitoring Requirements (Part I.D)**

Rationale: In accordance with 9 VAC 25-31-220D, WET limitations have been established because the effluent demonstrated a reasonable potential to cause instream toxicity. Commencing within one month of the effective date of the limit, the permittee shall conduct semiannual chronic toxicity testing for outfall 001. See **Attachment H** for the WET limitation determination calculations.

I. **Conditions Applicable to All VPDES Permits (Part II)**

Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

20. **NPDES Permit Rating Worksheet:** Total Score: 95

In accordance with the VPDES Permit Manual, the NPDES Permit Rating Worksheet has been completed, and this facility has been reclassified as an industrial major. The completed worksheet is found in **Attachment I.**

21. **Changes to Permit:**

A. **Permit Limits and Monitoring Requirements:** See Table III on page 16 for details on changes to the effluent limitations and monitoring requirements.

B. **The following special condition has been deleted from the permit:**

An Effluent Monitoring Frequency Special Condition (Part I.C.6) has been removed because the permittee does not qualify for reduced monitoring.

C. **Special conditions that have been modified from the previous permit and is listed below: (The referenced permit sections are for the new permit.)**

1. The Schedule of Compliance (Part I.B) has been modified to remove the compliance schedule for whole effluent toxicity limitations and include a schedule for the more stringent total recoverable copper limitations.

2. The Compliance Reporting under Part I.A Special Condition (Part I.C.1) has been revised to include information about significant figures.

3. The Operations and Maintenance Manual Requirement Special Condition Part I.C.3) has been revised in accordance with the VPDES Permit Manual to require the permittee to review the existing O&M Manual.

D. **A new special condition has been added to the permit are listed below:**

A Total Maximum Daily Load (TMDL) Reopener Special Condition has been added as Part I.C.6 to allow opening of the permit if necessary to comply with any applicable TMDL for the receiving stream.

22. **Variances/Alternate Limits or Conditions:** An application testing waiver was requested for BOD_5, COD, and TOC. Also, the permittee requested a waiver to allow grab samples for dissolved metals to be submitted in lieu of composite total metals. Since metals criteria are written in dissolved form, this waiver request was granted. These parameters were not considered of material importance to the permit, so the testing waiver was granted.

23. **Public Notice Information required by 9 VAC 25-31-280 B:**

All pertinent information is on file and may be inspected or copied by contacting Becky L. France at:

Virginia DEQ, Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, VA 24019
540-562-6700
blfrance@deq.virginia.gov

Persons may comment in writing or by e-mail to the DEQ on the proposed permit action and may request a public hearing during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing, and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action.

Following the comment period, the DEQ will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing.

Due notice of any public hearing will be given. See **Attachment J** for a copy of the public notice.

24. **303(d) Listed Segments (TMDL):** This facility discharges directly to Falling Creek. The stream segment receiving the effluent is not listed on the current 303(d) list; therefore, no Total Maximum Daily Loads (TMDLs) have been or are being developed for this segment.

25. **Additional Comments:**

A. **Reduced Effluent Monitoring:** In accordance with Guidance Memorandum 98-2005, all permit applications received after May 4, 1998, are considered for reduction in effluent monitoring frequency. Only facilities having exemplary operations that consistently meet permit requirements may qualify for reduced monitoring. To qualify for consideration, the facility should not have been issued any Warning Letters, Notices of Unsatisfactory Laboratory Evaluation, Letter of Noncompliance (LON) or Notices of Violation (NOV), or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years. The facility received the following warning letters within the past three years:

Warning Letter No. W2009-03-W-1002	significantly exceeded copper limitations
Warning Letter No. W2009-02-W-1001	significantly exceeded copper limitations
Warning Letter No. W2008-11-W-1003	significantly exceeded copper limitations
Warning Letter No. W2007-03-W-1005	failure to submit third year annual progress report

The facility does not meet the criteria discussed above and therefore is not eligible for reduced monitoring.

B. **Previous Board Action:** None

C. **Staff Comments:** The discharge is not controversial. The discharge is in conformance with the existing planning document for the area.

According to facility staff, the lagoons were lined with clay in 1989. Ground water monitoring is not considered necessary.

D. **Public Comment:** (to be determined)

E. **Tables:**

Table I	Discharge Description (Page 2)
Table II	Basis for Effluent Limitations (Page 14-15)
Table III	Permit Processing Change Sheet (Page 16)

F. **Attachments**

A. Flow Frequency Memorandum
B. Water Flow Diagrams
C. Site Inspection Report
D. USGS Topographic Map
E. Ambient Water Quality Information
- STORET Data (Station 4ABDA003.63)
- 2008 Impaired Waters Assessment Fact Sheet (Excerpt)
- 2004 Integrated Water Quality Assessment (Excerpt)
- Endangered Species Information

F. Effluent Data
G. Wasteload and Limit Calculations
- Mixing Zone Calculations (MIXER)
- Wasteload Allocation Spreadsheet (Intermittent Section)
- Antidegradation Wasteload Allocation Spreadsheets (Perennial Section)
- STATS Program Outputs (Cu, TRC)

H. Whole Effluent Toxicity Evaluation
- Whole Effluent Toxicity Testing Review Memorandum
- WETLIM10 Spreadsheet
- STATS Program Outputs (TU_c)

I. NPDES Permit Rating Worksheet
J. Public Notice
K. EPA Checksheet

Table II-1
BASIS FOR EFFLUENT LIMITATIONS

OUTFALL: 001
SIC CODE: 4941

( ) Interim Limitations
(x) Final Limitations

Effective Dates - From: Compliance with Schedule
To: Expiration Date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/Month	Estimate
pH (Standard Units)	3	NA	6.0	NA	9.0	1/Month	Grab
Total Suspended Solids	2	30 mg/L	NA	NA	60 mg/L	1/Month	5G/8H
Total Residual Chlorine	3	0.015 mg/L	NA	NA	0.015 mg/L	1/Month	Grab
Copper, Total Recoverable	3	3.6 µg/L	NA	NA	3.6 µg/L	1/Month	Grab
Whole Effluent Toxicity	3	NA	NA	NA	1.44 TU_c	1/3 Months	24 HC

NA = Not Applicable
NL = No Limitations; monitoring only
5G/8H= eight hour composite consisting of grab samples collected at hourly intervals until discharge ceases or a minimum of 5 grab samples have been collected.
24 HC = 24 hour composite

The basis for the limitations codes are:
1. Federal Effluent Guidelines:
2. Best Professional Judgment
3. Water Quality Standards
4. Other

Table II-2
BASIS FOR EFFLUENT LIMITATIONS

OUTFALL: 001
SIC CODE: 4941

(x) Interim Limitations
( ) Final Limitations

Effective Dates - From: Effective Date
To: Compliance with Schedule

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/Month	Estimate
pH (Standard Units)	3	NA	6.0	NA	9.0	1/Month	Grab
Total Suspended Solids	2	30 mg/L	NA	NA	60 mg/L	1/Month	5G/8H
Total Residual Chlorine	3	0.015 mg/L	NA	NA	0.015 mg/L	1/Month	Grab
Copper, Total Recoverable	3	3.9 µg/L	NA	NA	3.9 µg/L	1/Month	Grab
Whole Effluent Toxicity	3	NA	NA	NA	1.44 TU_c	1/3 Months	24 HC

NA = Not Applicable
NL = No Limitations; monitoring only
5G/8H= eight hour composite consisting of grab samples collected at hourly intervals until discharge ceases or a minimum of 5 grab samples have been collected.
24 HC = 24 hour composite

The basis for the limitations codes are:
1. Federal Effluent Guidelines:
2. Best Professional Judgment
3. Water Quality Standards
4. Other

Table III
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	Total Suspended Solids	1/ 6 Months	1/Month			The permittee no longer qualifies for reduced monitoring, so a monitoring frequency recommended by the VPDES Permit Manual has been required.	4/13/09
001	Copper, Total Recoverable	NA	1/Month	3.9 µg/L monthly average & 3.9 µg/L daily maximum	3.6 µg/L monthly average & 3.6 µg/L daily maximum	Total recoverable copper limitations have been added because the data submitted with the application indicate a reasonable potential to exceed the acute water quality criteria. A compliance schedule has been included for the decrease in copper limit to 3.6 µg/L.	4/13/09

Attachment A

Flow Frequency Information

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
3019 Peters Creek Road, Roanoke, Virginia 24019

SUBJECT: Flow Frequency Determination
Falling Creek Water Filtration Plant - Reissuance

TO: Permit File

FROM: Becky L. France, Environmental Engineer Senior

DATE: April 6, 2009

The Falling Creek Water Filtration Plant discharges to an intermittent section of Falling Creek. Stream flow frequencies are required at this site to develop effluent limitations for the VPDES permit.

At the outfall, the stream is intermittent as shown on the USGS Stewartsville Quadrangle topographic map. The flow frequencies for this discharge point listed on the attachment are 0.0 MGD.

For determination of antidegradation baselines, flow frequencies are also needed at the point where Falling Creek becomes perennial. These flow frequencies are estimated using the USGS continuous record gauge on Tinker Creek near Daleville, VA (#02055100) for the period from 1956 to 2003. The gauge is located upstream of the discharge on a tributary to the Roanoke River. The values at the perennial point on Falling Creek were determined by drainage area proportions and do not address any withdrawals, discharges, or springs lying between the headwaters and the Tinker Creek gauge.

The high flow months are January through May. The flow frequencies for the gauge and the discharge point are presented in the attached table.

Flow Frequency Determination: Falling Creek Water Filter Plant

Reference Gauge (data from 1956 to 2003)
Tinker Creek near Daleville, VA (#02055100)
Drainage Area [mi^2] = 11.7

	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	1.0	0.6	High Flow 1Q10 =	2.3	1.5
7Q10 =	1.0	0.6	High Flow 7Q10 =	2.6	1.7
30Q5 =	1.6	1.0	HM =	5.0	3.2
30Q10=	1.2	0.8	High Flow 30Q10=	3.2	2.1

Falling Creek Intermittent Section (Outfall 001)
Drainage Area [mi^2] = 1.42

	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	**0.0**	**0.0**	**High Flow 1Q10 =**	**0.0**	**0.0**
7Q10 =	**0.0**	**0.0**	**High Flow 7Q10 =**	**0.0**	**0.0**
30Q5 =	**0.0**	**0.0**	**HM =**	**0.0**	**0.0**
30Q10=	**0.0**	**0.0**	**High Flow 30Q10=**	**0.0**	**0.0**

High Flow Months January through May

Flow frequencies for the reissued permit (05/06/04)
Falling Creek at Perennial Point
Drainage Area [mi^2] = 5.6

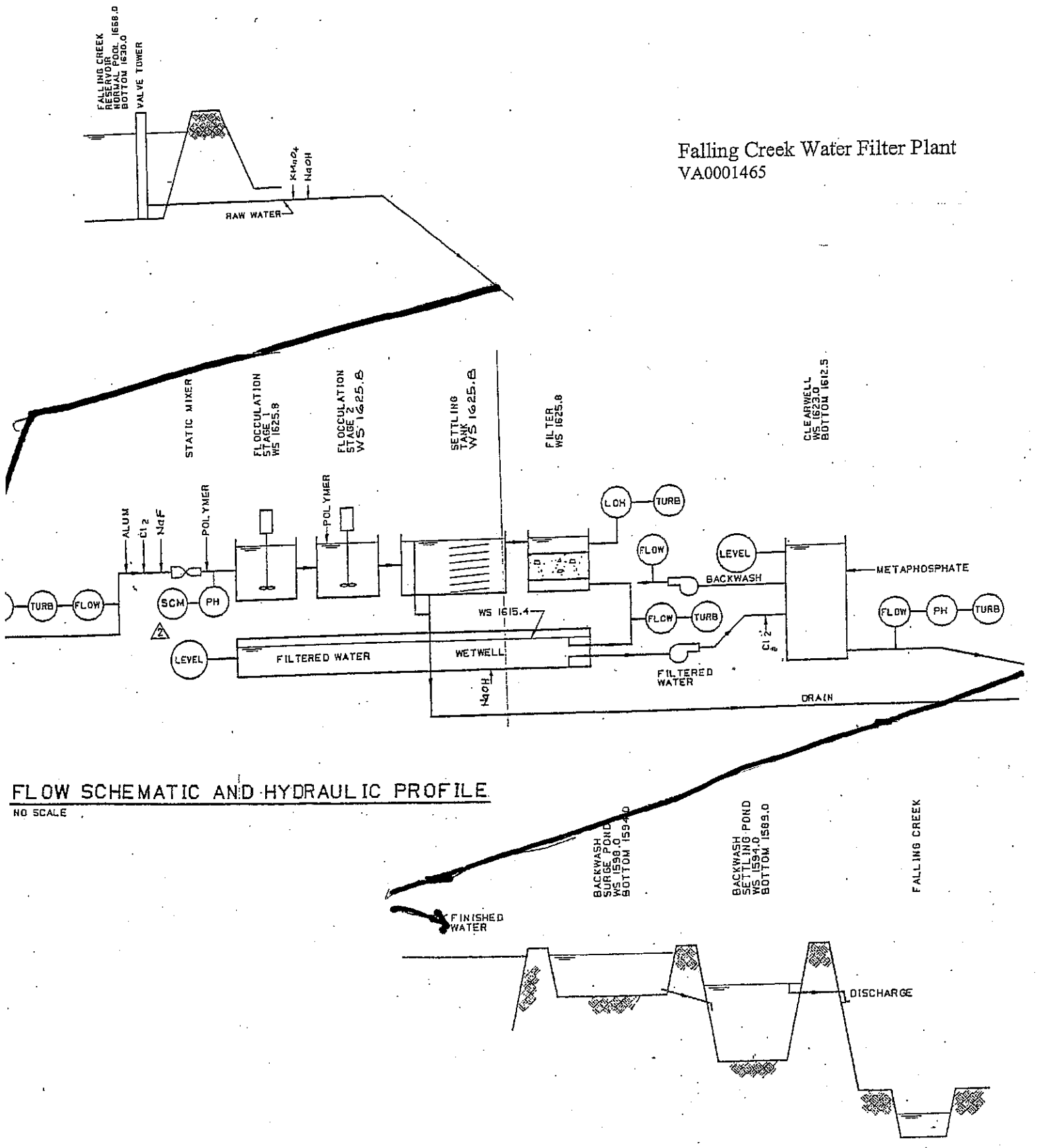
	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	**0.5**	**0.3**	**High Flow 1Q10 =**	**1.1**	**0.7**
7Q10 =	**0.5**	**0.3**	**High Flow 7Q10 =**	**1.2**	**0.8**
30Q5 =	**0.8**	**0.5**	**HM =**	**2.4**	**1.5**
30Q10=	**0.6**	**0.4**	**High Flow 30Q10=**	**1.5**	**1.0**

SITEID	NAME	RECORD	LATLONG	DAAREA	HARMEAN	HF30Q10	HF7Q10	HF1Q10	Z30Q5	Z30Q10	Z7Q10	Z1Q10	Z1Q30	HFMTHS	STATPERIOD	YRSTRN
02055100	Tinker Creek near Daleville, Va.(Daleville Quad)	R, 1956-	Lat 37 25'03", Long 79 56'07", NAD 83	11.7	5.0	3.2	2.6	2.3	1.6	1.2	1.0	0.96	0.65	JAN-MAY	1956-2003	2005

Attachment B

Water Flow Diagrams

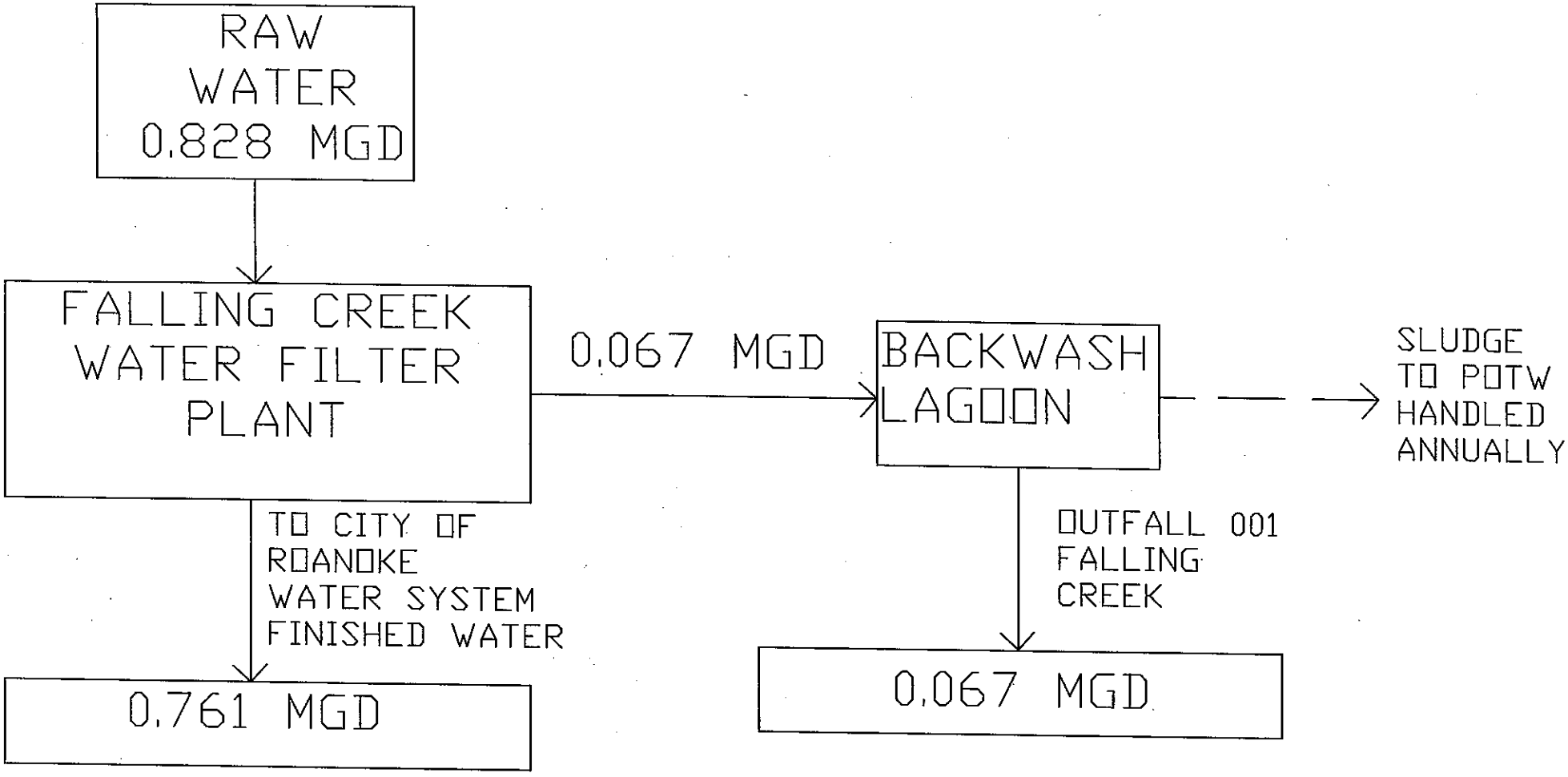
Falling Creek Water Filter Plant
VA0001465



FLOW SCHEMATIC AND HYDRAULIC PROFILE

NO SCALE

SCHEMATIC OF WATER FLOW
FALLING CREEK WATER FILTER PLANT
ROANOKE, VIRGINIA 24016
VPDES NO. VA0001465
BEDFORD COUNTY



Attachment C

Site Inspection Report

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road Roanoke, VA 24019

SUBJECT: Site Inspection Report for Falling Creek Water Filtration Plant
Reissuance of VPDES Permit No. VA0001465

TO: Permit File

FROM: Becky L. France, Environmental Engineer Senior BLF

CC: Sam Hale, Environmental Inspector Supervisor

DATE: March 25, 2009

On March 25, 2009, a site inspection was conducted at Falling Creek Water Filtration Plant. The purpose of this site visit was to review the water treatment system, identify chemicals stored on site, verify the outfall location, and identify stream characteristics at the outfall. Delmar Irving, Water Production Superintendent, and Gregory Belcher, Water Supervisor, were present at the site inspection.

The Falling Creek Water Filtration Plant distributes potable water to Vinton, Stewartsville, portions of Bedford County, and parts of southeast Roanoke City. The treatment facility began operation in 1929, and in 1989 underwent renovations. At the time of the site visit, the facility was producing about 0.691 MGD of potable water.

Falling Creek Reservoir and Beaverdam Reservoir provide a safe yield of 1.45 MGD. The two reservoirs operate as a single source. Water from Beaverdam Reservoir flows through a cast iron pipe and an open earthen channel into Falling Creek Reservoir. The flow from the reservoirs can be controlled. The intake is located in the Falling Creek Reservoir, and withdrawals can be taken at four levels. As needed, copper sulfate is added to Falling Creek Reservoir.

Water Treatment Process

The treatment system consists of two parallel treatment trains each with a two-stage flocculation chamber, settling chamber, and multimedia filtration chamber. Potassium permanganate and sodium hydroxide are added below the dam at the intake structure. Chlorine gas and fluoride are added to the line coming into the treatment process. Alum and polymer are also added to this line except during periods of cold water temperature operation when polyaluminum hydroxychlorosulfate (PAC) may be used as the coagulant.

Following chemical addition, the water is split between two parallel baffled flocculation basins. Then, the water proceeds to two parallel sedimentation basins where the bulk of the solids are removed. The sedimentation basins contain tube settler modules. After the sedimentation basins, the water passes through two parallel mixed media rapid sand filters. The filter beds consist of anthracite, sand, and gravel. Filtered water is transferred to a 28,532 gallon wet well under the treatment units and then to a 50,000 gallon clearwell. Sodium hydroxide, gaseous chlorine, and zinc orthophosphate may be added to the clearwell prior to gravity flow to the Parkway storage tank for distribution.

The filters are periodically backwashed. Sludge is collected in the settler tubes and wasted at each filter backwash. Wastewater is generated from a continuous sampler and backwash water. Sodium bisulfite powder is manually added to backwash water as it leaves the filter to remove chlorine. Process water from these operations flows into two clay lined lagoons that are operated in series. When the solids level in one pond is within one foot of the

overflow pipe, the waste stream is valved over to the other pond. Settled solids are removed from the lagoons once a year. At the time of the side visit, there were a great of solids in the first pond. Plant personnel anticipates that solids will be removed from the ponds in late spring when the plant will be taken out of service to facilitate maintenance to the Falling Creek Reservoir Dam.

Material Storage

Alum, polymer, chlorine, copper sulfate, sodium bisulfite, sodium fluoride, and sodium hydroxide are added to the water during processing. During cool weather polyaluminum hydroxychlorosulfate (PAC) may be substituted for alum and polymer. Miscellaneous laboratory reagents and other maintenance chemicals are also stored onsite. The following chemicals were observed at the treatment facility:

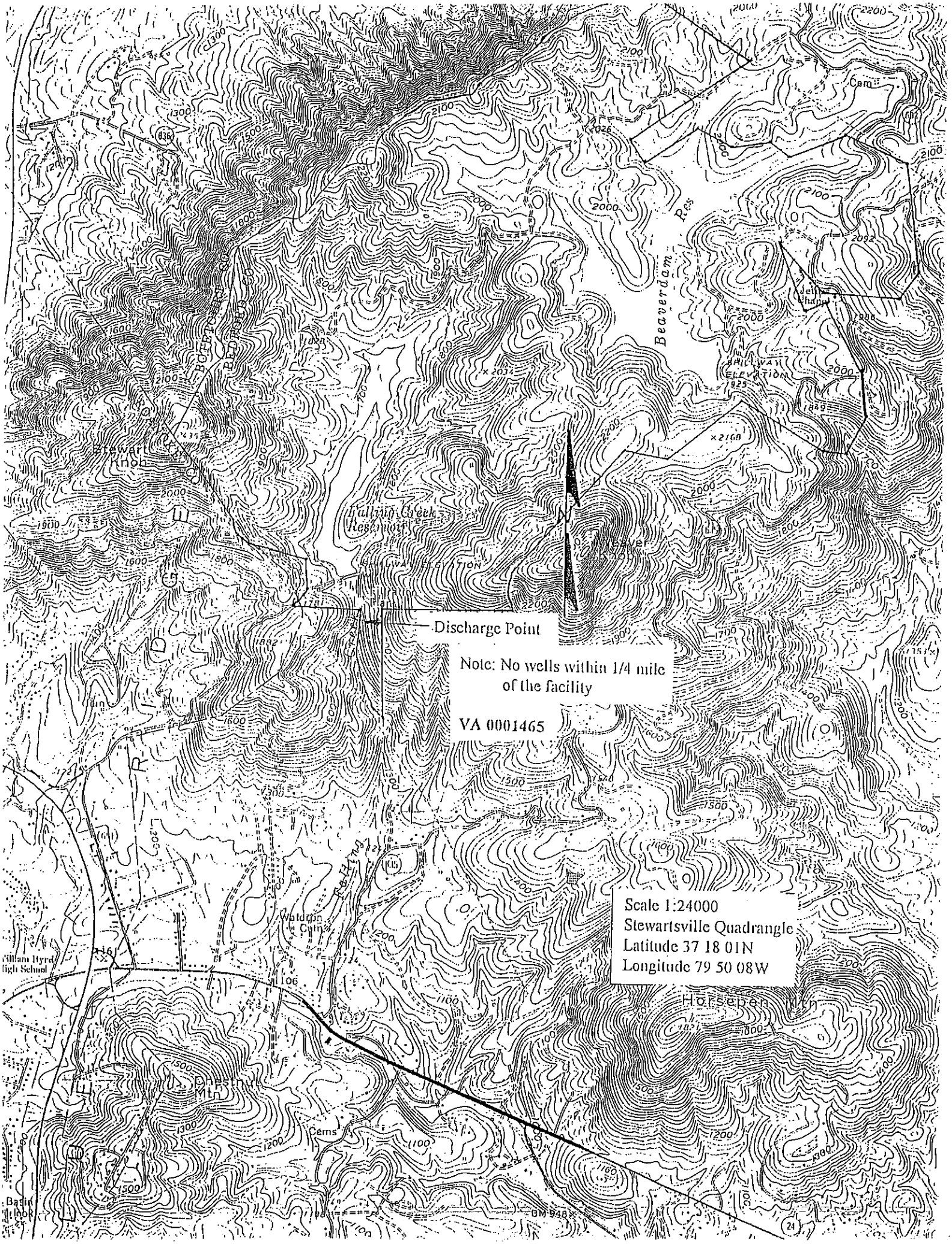
alum, liquid tote tanks; 3,000 gallon storage tank
chlorine gas, 4 (150 pound) compressed gas cylinders
copper sulfate (50 pound bags)
sodium bisulfite, (liquid) 55 gallon drum
sodium fluoride, 55 pound bags, transferred to 50 gallon mixer tank
sodium hydroxide, 2,000 gallon tank, transferred to 40 gallon heated day tank
polymer, (CAT FLOC-TL) diallydimethylammonium chloride, 100 gallon tank
(PAC) polyaluminum hydroxychlorosulfate (liquid), 3 (55 gallon drums), transferred to 300 gallon tank
propane tanks, 2 (AST)
diesel tank, 1 (AST) (bermed)

Description of Receiving Waters

The effluent discharges from the lagoon through an 18-inch pipe to the receiving stream. At the time of the site visit, there was a discharge at the outfall which is located on Falling Creek at the headwaters. According to plant personnel, the stream does not go dry. The stream bed is rocky. At the time of the site visit, there were no noticeable accumulations of solids below the outfall.

Attachment D

USGS Topographic Map


Discharge Point
Note: No wells within 1/4 mile of the facility
VA 0001465
Scale 1:24000
Stewartsville Quadrangle
Latitude 37 18 01N
Longitude 79 50 08W
Beaverdam Res
Stewart Knob
Hallrun Creek Reservoir
Horsepen Mtn
Chestnut Mtn
Waldron Cairns
Cems
BM 948

Attachment E

Ambient Water Quality Information

- **STORET Data (Station 4ABDA003.63)**
- **2008 Impaired Waters Assessment Fact Sheet (Excerpt)**
- **2004 Integrated Water Quality Assessment (Excerpt)**
- **Endangered Species Information**

Falling Creek WFP
VA0001465

Falling Creek (Above Outfall)

Collection Date	Hardness as $CaCO_3$ (mg/L)
11/21/08	68
12/29/08	110
12/23/08	106
12/30/08	100

mean 96 mg/L

Falling Creek WFP Raw Water Intake (VA0001465)

Date	Total Copper mg/L
1/5/2004	0.05
3/5/2004	0.03
4/26/2004	0.06
5/21/2004	0.05
6/8/2004	0.08
7/21/2004	0.01
8/27/2004	0.03
9/24/2004	0.02
10/21/2004	0.09
11/17/2004	0.09
12/8/2004	0.11
3/18/2005	0.1
4/19/2005	0.09
5/25/2005	0.06
6/24/2005	0.05
8/2/2005	0.05
9/30/2005	0.05
10/28/2005	0.07
11/23/2005	0.05
1/13/2006	<0.01
2/15/2006	0.02
3/24/2006	0.01
4/19/2006	0.01
5/17/2006	0.01
6/14/2006	0.06
7/31/2006	0.07
8/3/2006	0.05
8/4/2006	0.04
8/8/2006	0.01
1/8/08	0.06
1/25/08	0.04
2/13/08	0.05
2/28/08	0.04
3/10/08	0.03
3/26/08	0.05
4/7/08	0.02
4/23/08	0.05
5/5/08	0.06
5/27/08	0.06
6/2/08	0.05
6/18/08	0.10
7/17/08	ND
7/28/08	0.03
8/26/08	0.03

*Note 2004-2005 data using HACH method.

VAW-L07R
4ABDA003.63

Beaverdam Creek

Collection Date Time	Temp Celsius	Field pH (S.U.)
2/9/2000 10:00	1.8	8
6/13/2000 10:00	24.2	7.5
7/18/2000 15:00	24.6	8
9/19/2000 13:30	18.4	8.6
11/9/2000 10:00	10.6	9
1/18/2001 12:00	3	8.2
3/19/2001 13:30	8.5	8.8
5/1/2001 13:00	18.2	8.7
7/10/2003 13:00	22.64	7.29
9/24/2003 14:10	17.02	7.22
11/20/2003 13:00	11.36	6.48
3/16/2004 14:40	9.8	7.3
5/25/2004 13:45	22.6	7.4
7/19/2004 12:40	21.5	7.09
9/30/2004 12:00	17.7	6.81
11/9/2004 14:45	9.3	7.5
1/11/2005 10:40	6.76	7.1
3/14/2005 14:05	8.27	7.22
5/24/2005 15:15	15.6	7.5
7/11/2005 10:00	23.3	7.9
9/7/2005 10:00	18.7	8.65
11/1/2005 10:00	8.7	8.6
1/5/2006 13:30	5.4	8.2
3/20/2006 10:30	6.4	7.7
5/2/2006 11:00	13.9	7.4
7/13/2006 10:00	23.5	7.8
9/6/2006 10:00	19.8	7.9
11/28/2006 10:00	6.8	7.7
1/30/2007 11:00	1	8.6
3/27/2007 10:30	14.8	7.6
5/7/2007 10:30	12.3	7.5
7/17/2007 10:30	22.7	7
9/19/2007 11:30	17.5	7.2
11/13/2007 11:00	9.7	7.5
1/29/2008 10:30	2.4	7.3
3/27/2008 11:00	12.1	7.1
5/5/2008 11:30	16.3	7
7/8/2008 12:00	25	6.4
9/15/2008 12:30	23.3	7.6
11/18/2008 11:00	5.3	7.6
2/10/2009 11:30	6.2	8.5

90th percentile pH	8.6	S.U.	
10th percentile pH	7.0	S.U.	
90th percentile temp	23	°C	
90th percentile temp	16	°C	(Jan. - May)

2008 Impaired Waters

Categories 4 and 5 by DCR Watershed*

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Roanoke and Yadkin River Basins

Fact Sheet prepared for DCR Watershed: L07*

Cause Group Code: **L07R-01-BAC** **Beaverdam Creek**

Location: Beaverdam Creek mainstem waters from the WQS designated public water supply (PWS) section, eg. 5 miles above the 795 ft. pool elevation of Smith Mtn. Lake on downstream to the inundation of Beaverdam Creek's waters at Smith Mountain Lake at River Mile 2.78 (Stewartsville, Irving, Goodview and Hardy Quads).

City / County: Bedford Co.

Use(s): Recreation

Cause(s) /
VA Category: Escherichia coli/ 4A

Beaverdam Creek Bacteria TMDL Load Duration Study is complete and US EPA approved 7/07/2006 FED ID 17733. The 1999 Federal Consent Decree includes 4ABDA003.63 as an Attachment B station for fecal coliform bacteria- 303(d) Listed 2002. Escherichia coli (E.coli) replaces fecal coliform (FC) bacteria as the indicator as per Water Quality Standards [9 VAC 25-260-170. Bacteria; other waters]. The 4.76 bacteria impairment remains.

4ABDA003.63- (Off Rt. 757) E.coli exceeds the 235 cfu/100 ml instantaneous criterion in 20 of 33 samples. Exceeding observations range from 300 to greater than 2000 cfu/100 ml. Five of six geometric means exceed the 126 cfu/100 ml criterion. The 2006 Integrated Report (IR) reveals exceedences of the instantaneous criterion in 14 of 21 samples. Exceeding observations range from 300 to 1800 cfu/100 ml.

Assessment Unit / Water Name / Description	Cause Category / Name	Cycle First Listed	TMDL Schedule	Size
VAW-L07R_BDA01A00 / Beaverdam Creek Lower / Beaverdam Creek mainstem waters from the WQS designated public water supply (PWS) section, eg. 5 miles above the 795 ft. pool elevation of Smith Mtn. Lake on downstream to the inundation of Beaverdam Creek's waters at Smith Mtn. Lake.	4A Escherichia coli	2006	2006	4.76

Beaverdam Creek **DCR Watershed: L07***	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
Escherichia coli - Total Impaired Size by Water Type:			**4.76**

Sources:

Livestock (Grazing or Feeding Operations)	Municipal (Urbanized High Density Area)	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	Unspecified Domestic Waste
Wastes from Pets	Wildlife Other than Waterfowl		

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.

2004 Use Attainment by Assessment Units (AU)

Watershed ID: VAW-L07R

Total Watershed Size: 167.95 M

AU ID: **VAW-L07R_ZZZ01A00** **15.57** M *AU Overall Category:* **3A**

LOCATION: Remaining waters tributary to mainstem Creeks around Smith Mtn. Lake. None are within the WQS designated public water supply (PWS) section.

State TMDL ID	*Use*	*WQS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class III Sec. 6a None NEW-1 No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-L07R_SWC01A02** **1.23** M *AU Overall Category:* **3A**

LOCATION: Stony Creek mainstem from its inundation at Smith Mtn. Lake upstream to its headwaters. All are within the WQS designated public water supply (PWS) section, eg. within 5 miles of 795 ft. Smith Mtn. Lake pool elevation.

State TMDL ID	*Use*	*WQS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_SML01A00** **56.03** M *AU Overall Category:* **3A**

LOCATION: Direct tributaries to Smith Mtn. Lake. All are within the WQS designated public water supply (PWS) section, eg. within 5 miles of 795 ft. Smith Mtn. Lake pool elevation.

State TMDL ID	*Use*	*WQS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_SCA02A00** **2.14** M *AU Overall Category:* **3A**

LOCATION: Sandy Creek mainstem and tributary headwaters outside the 5 mile WQS designated public water supply (PWS) section, eg. within 5 miles of the Smith Mtn. Lake 795 ft. pool elevation.

State TMDL ID	*Use*	*WQS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class III Sec. 6a None NEW-1 No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-L07R_SCA01A00** **2.14** M *AU Overall Category:* **3A**

LOCATION: Sandy Creek and tributaries within the WQS designated public water supply (PWS) section, eg. within 5 miles of Smith Mtn. Lake 795 ft. pool elevation.

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_SAB01A02** **2.09** M *AU Overall Category:* **3A**

LOCATION: Direct tributary to Smith Mtn. Lake at Snug Harbor within the WQS designated public water supply (PWS) section, eg. within 5 miles upstream of 795 ft. Smith Mtn. Lake pool elevation.

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_PTA01A00** **8.39** M *AU Overall Category:* **3A**

LOCATION: Prater Creek and tributaries from its headwaters downstream to its mouth on the Roanoke River in headwaters of Smith Mtn. Lake. Entire drainage is within the 5 mile (795 ft pool elevation of SML) WQS designated public water supply (PWS) section.

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_LVL02A00** **7.81** M *AU Overall Category:* **3A**

LOCATION: Linville Creek headwaters and tributaries downstream to the WQS designated public water supply (PWS) section. PWS extends 5 miles upstream from the 795 ft. pool elevation of Smith Mtn. Lake.

State TMDL ID	Use	WOS Attainment	303(d) Impairment Initial List Year
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	

Wildlife	Not Assessed

WQS Class III Sec. 6a None NEW-1 No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-L07R_LVL01A02** **5.03** M *AU Overall Category:* **3A**

LOCATION: Linville Creek mainstem within the WQS designated public water supply (PWS) section, within 5 miles of Smith Mtn. Lake 795 ft. pool elevation.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisory.

AU ID: **VAW-L07R_LVL01A00** **10.85** M *AU Overall Category:* **3A**

LOCATION: Linville Creek tributaries within the WQS designated public water supply (PWS) section, eg. within 5 miles of Smith Mtn. Lake 795 ft. pool elevation.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_JUM01A02** **1.43** M *AU Overall Category:* **3A**

LOCATION: Jumping Run from its inundation at Smith Mtn. Lake upstream 1.44 miles, within the WQS designated public water supply (PWS) section; within 5 miles of 795 ft. Smith Mtn. Lake pool elevation.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_IND01A02** **3.87** M *AU Overall Category:* **3A**

LOCATION: Indian Creek mainstem from its inudation at Smith Mtn. Lake upstream to its headwaters. All within the WQS designated public water supply (PWS) section, eg. within 5 miles of 795 ft. Smith Mtn. Lake pool elevation.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	

Recreation	Not Assessed
Wildlife	Not Assessed

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_FIN04A00** **0.80** M *AU Overall Category:* **3A**

LOCATION: Tributary headwaters to Roanoke City owned Falling Creek Reservoir.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class III Sec. 6a None NEW-1 No current data. These waters are not assessed. No VDH fish consumption advisory. Drinking water- WQS do not specifically include tributaries to the reservoir, although no known problems.

AU ID: **VAW-L07R_FIN02A00** **6.86** M *AU Overall Category:* **3A**

LOCATION: Falling Creek and tributaries below Falling Creek Reservoir downstream to the WQS designated PWS section end. The WQS designated PWS section is defined as 5 miles above the Smith Mtn. Lake 795 ft. pool elevation.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class III Sec. 6a None NEW-1 No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-L07R_FIN01A00** **10.54** M *AU Overall Category:* **3A**

LOCATION: Falling Creek and tributaries within the WQS designated public water supply (PWS) section, eg. within 5 miles of Smith Mtn. Lake 795 ft. pool elevation.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Public Water Supply	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_BVE04A00** **1.04** M *AU Overall Category:* **3A**

LOCATION: Tributaries to the Roanoke City owned Beaverdam Creek Reservoir.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	Not Assessed	
	Fish Consumption	Not Assessed	
	Recreation	Not Assessed	
	Wildlife	Not Assessed	

WQS Class III Sec. 6a None NEW-1 No current data. These waters are not assessed. No VDH fish consumption advisory. Drinking water- WQS do not specifically include tributaries to the reservoir, although no known problems.

AU ID: **VAW-L07R_BVE02A00** **15.32** M *AU Overall Category:* **3A**

LOCATION: West Fork Beaverdam Creek and tributaries below Beaverdam Creek Reservoir downstream to the WQS designated public water supply (PWS) section. Waters are not within the 5 mile Smith Mtn. Lake 795 ft. pool elevation.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	**Not Assessed**	
	Fish Consumption	**Not Assessed**	
	Recreation	**Not Assessed**	
	Wildlife	**Not Assessed**	

WQS Class III Sec. 6a None NEW-1 No current data. These waters are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-L07R_BVE01A00** **5.95** M *AU Overall Category:* **3A**

LOCATION: West Fork Beaverdam Creek and tributaries downstream to the West Fork's confluence with Beaverdam Creek. The waters are within the 5 mile 795 ft. pool elevation of Smith Mtn. Lake and WQS designated as public water supply (PWS).

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	**Not Assessed**	
	Fish Consumption	**Not Assessed**	
	Public Water Supply	**Not Assessed**	
	Recreation	**Not Assessed**	
	Wildlife	**Not Assessed**	

WQS Class IV Sec. 6i PWS NEW-1 No current data. These waters are not assessed. No VDH fish consumption or drinking water advisories.

AU ID: **VAW-L07R_BDA02A00** **5.28** M *AU Overall Category:* **2A**

LOCATION: Beaverdam Creek mainstem from its headwaters downstream to the WQS designated public water supply (PWS) section, eg. 5 miles above the Smith Mtn. Lake 795 ft. pool elevation.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	**Fully Supporting**	
	Fish Consumption	**Not Assessed**	
	Recreation	**Not Assessed**	
	Wildlife	**Fully Supporting**	

WQS Class III Sec. 6a None NEW-1
Assessment basis: DEQ station 4ABDA011.79 (FPM- VAEQ99-066) 4ABDA011.79- A probalistic site; DO, Temp, pH and NH3-N all Fully Support. No excursions of the PEC SVs for sediment. Single observations of FC and TP fully support but are not assessed. No VDH fish consumption advisory.

AU ID: **VAW-L07R_BDA01A00** **5.58** M *AU Overall Category:* **5A**

LOCATION: Beaverdam Creek mainstem waters from the WQS designated public water supply (PWS) section, eg. 5 miles above the 795 ft. pool elevation of Smith Mtn. Lake on downstream to the inundation of Beaverdam Creek's waters at Smith Mtn. Lake.

State TMDL ID	*Use*	*WOS Attainment*	*303(d) Impairment Initial List Year*
	Aquatic Life	**Fully Supporting**	
	Fish Consumption	**Not Assessed**	
	Public Water Supply	**Fully Supporting**	

2004 Use Attainment by Assessment Units (AU)

VAW-L07R-01	Recreation	Not Supporting
	303(d) Parameter: Total Fecal Coliform	2002
	Wildlife	Fully Supporting

WQS Class IV Sec. 6i PWS NEW-1
Assessment basis DEQ stations 4ABDA003.63 (AQ- 1999 Federal Consent Decree station for FC 303(d) Listed in 2002) and 4ABDA002.57 ('99 PCB Sed only). 4ABDA003.63- FC exceeds the 400 cfu/100 ml criterion in two of 18 samples. Exceeding observations are 1400 and greater than 8000 cfu/100 ml. DO, Temp, pH TP, and NH3-N all Fully Support. One exceedance of the TP SV of 0.20 mg/l is found at 0.37 mg/l from 18 samples. Sediment Fully Supports with no exceedances of the PEC SVs. 4ABDA002.57- WQS 1999 sediment collection finds no exceedances of the PEC PCB SV. No VDH fish consumption or drinking water advisories.

DCR
Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

WebID: W633753896542812500

Client Project Number: VA0001465

PROJECT INFORMATION

TITLE: Falling Creek WFP

DESCRIPTION: process wastewater discharge

EXISTING SITE CONDITIONS: backwash water from water treatment plant

QUADRANGLES: STEWARTSVILLE

COUNTIES: Bedford

Latitude/Longitude (DMS): 371759/795012

Acreage: 1

Comments:

REQUESTOR INFORMATION

Priority: No **Tier Level:** 2 **Tax ID:**

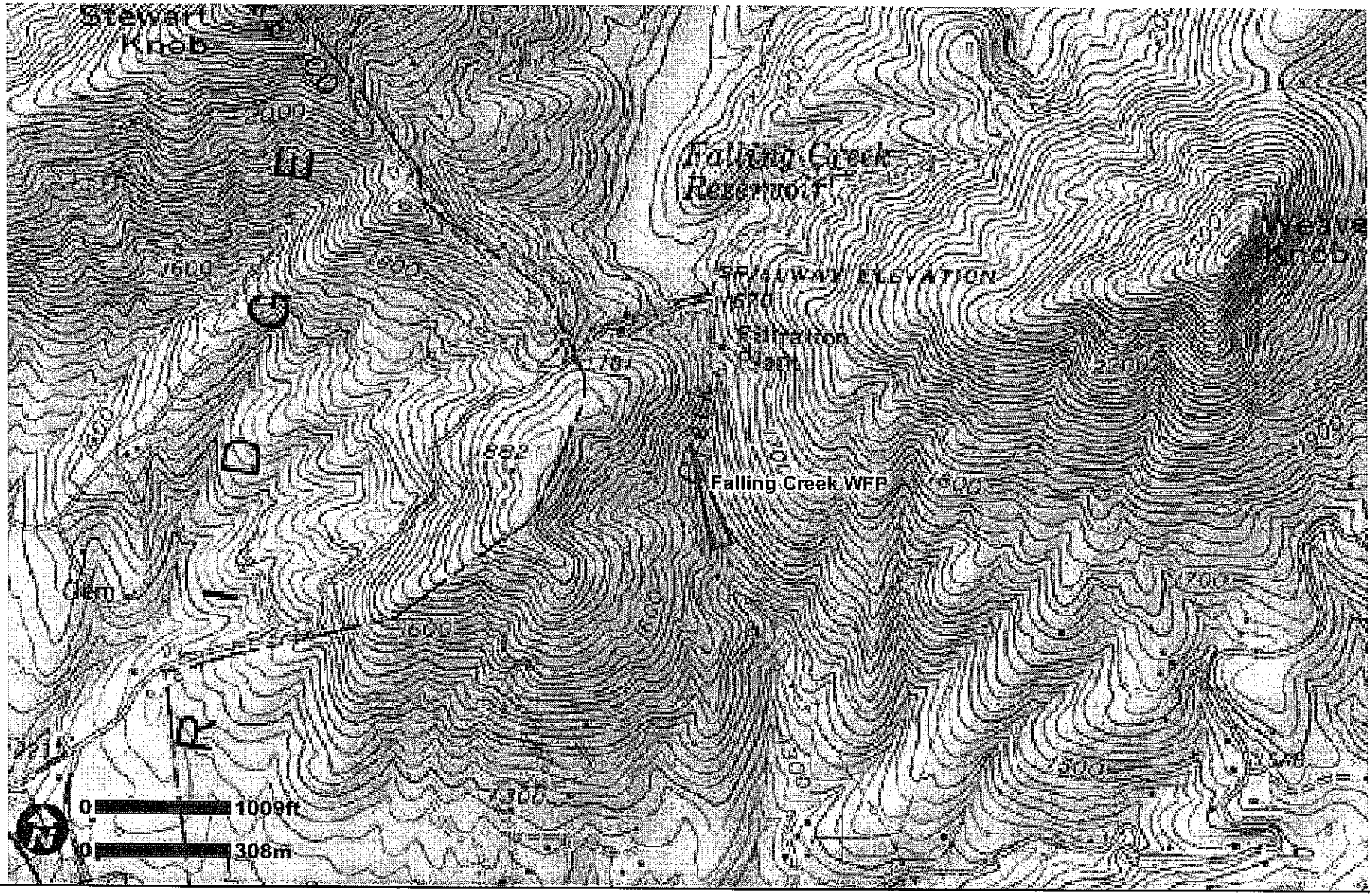
Contact Name: Becky L France

Company Name: DEQ-West Central Regional Office

Address: 3019 Peters Creek Road

City: Roanoke **State:** VA **Zip:** 24019

Phone: 540-562-6793 **Fax:** 540-562-6725 **Email:** blfrance@deq.virginia.gov



Quads: STEWARTSVILLE

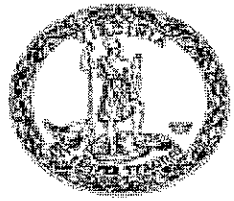
Counties: Bedford

Falling Creek WFP

Company: DEQ-West Central Regional Office

Lat/Long: 371759/795012

L. Preston Bryant, Jr
Secretary of Natural Resources



Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources in the vicinity of the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics files, natural heritage resources have not been documented within two miles of the identified project boundaries. In addition, our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

Any absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks additional natural heritage resources. New and updated information is continually added to Biotics. Please revisit this website or contact DCR for an update on this natural heritage information if a significant amount of time passes (DCR recommends no more than one year) before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain information not documented in the Natural Heritage Data Explorer. Their database may be accessed from http://www.dgif.virginia.gov/wildlife/info_map/index.html , or contact Shirl Dressler at (804) 367-6913.

Thank you for submitting your project to the Virginia Department of Conservation and Recreation's Natural Heritage Data Explorer Web Service. Should you have any questions or concerns about this report, the Data Explorer, or other Virginia Natural Heritage Program services, please contact the Natural Heritage Project Review Unit at 804-371-2708.

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- Governor

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- Virginia Department of Game and Inland Fisheries

- **Fish and Wildlife Information Service**

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- Species Information
- By Name
- By Land Management
- References
- Geographic Search
- By Map
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- By Place Name
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VaFWIS Search Report Compiled on 4/1/2009, 3:19:20 PM

Known or likely to occur within a **2 mile radius of 37,17,59. 79,50,13.**
in **019 Bedford County, 023 Botetourt County, 161 Roanoke County, VA**

577 Known or Likely Species ordered by Status Concern for Conservation
(displaying first 47) (47 species with Status* or Tier I**)

BOVA Code	Status*	Tier**	Common Name	Scientific Name	Confirmed	]
010214	FESE	I	Logperch, Roanoke	Percina rex	Yes	TE
060017	FESE	I	Spinymussel, James	Pleurobema collina		BO
040267	SE	I	Wren, Bewick's	Thryomanes bewickii	Yes	CB
040096	ST	I	Falcon, peregrine	Falco peregrinus		BO
040129	ST	I	Sandpiper, upland	Bartramia longicauda		BO
040293	ST	I	Shrike, loggerhead	Lanius ludovicianus	Yes	BB
040379	ST	I	Sparrow, Henslow's	Ammodramus henslowii		BO
100155	FSST	I	Skipper, Appalachian grizzled	Pyrgus wyandot		BO
010127	FSST	II	Madtom, orangefin	Noturus gilberti		BO
040093	FSST	II	Eagle, bald	Haliaeetus leucocephalus	Yes	CB
060173	FSST	II	Pigtoe, Atlantic	Fusconaia masoni		BO
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans		BO
100248	FS	I	Fritillary, regal	Speyeria idalia idalia		BO
010346	FSSS	II	Shiner, roughhead	Notropis semperasper		BO
020039	FSSS	II	Salamander, Peaks of Otter	Plethodon hubrichti		BO
100154	FS	II	Butterfly, Persius duskywing	Erynnis persius persius		BO
100256	FS	II	Crescent, tawny	Phyciodes batesii batesii		BO
010110	FS	III	Jumprock, bigeye	Moxostoma ariommum		BO
100001	FS	IV	fritillary, Diana	Speyeria diana		BO
010077	SS	I	Shiner, bridle	Notropis bifrenatus		BO
040372	SS	I	Crossbill, red	Loxia curvirostra	Yes	CB
040306	SS	I	Warbler, golden-winged	Vermivora chrysoptera		BO
010174	SS	II	Bass, Roanoke	Ambloplites cavifrons		BO
040213	SS	II	Owl, northern saw-whet	Aegolius acadicus		BO
040304	SS	II	Warbler, Swainson's	Limnothlypis swainsonii		BO
040266	SS	II	Wren, winter	Troglodytes troglodytes	Yes	CB
010115	SS	III	Sucker, rustyside	Thoburnia hamiltoni		BO
040094	SS	III	Harrier, northern	Circus cyaneus	Yes	CB
040040	SS	III	Ibis, glossy	Plegadis falcinellus		BO
040036	SS	III	Night-heron, yellow-crowned	Nyctanassa violacea violacea		BO
040204	SS	III	Owl, barn	Tyto alba pratincola	Yes	CB
030012	CC	IV	Rattlesnake, timber	Crotalus horridus		BO
040264	SS	IV	Creeper, brown	Certhia americana	Yes	CB
040364	SS		Dickcissel	Spiza americana		BO
040032	SS		Egret, great	Ardea alba egretta	Yes	CB
040366	SS		Finch, purple	Carpodacus purpureus	Yes	CB
040241	SS		Flycatcher, alder	Empidonax alnorum		BO

040285	SS		Kinglet, golden-crowned	Regulus satrapa	Yes	CB
040112	SS		Moorhen, common	Gallinula chloropus cachinnans	Yes	CB
040262	SS		Nuthatch, red-breasted	Sitta canadensis	Yes	CB
040189	SS		Tern, Caspian	Sterna caspia		BO
040278	SS		Thrush, hermit	Catharus guttatus	Yes	CB
040314	SS		Warbler, magnolia	Dendroica magnolia		BO
050045	SS		Otter, northern river	Lontra canadensis lataxina		BO
030040		I	Pinesnake, northern	Pituophis melanoleucus melanoleucus		BO
040225		I	Sapsucker, yellow-bellied	Sphyrapicus varius	Yes	CB
040319		I	Warbler, black-throated green	Dendroica virens		BO

To view **All 577 species** View 577

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Cand SC=State Candidate; CC=Collection Concern; SS=State Special Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=V Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

View Map of All Query Results from All Observation Tables

Anadromous Fish Use Streams

N/A

Fish Impediments

N/A

Colonial Water Bird Survey

N/A

Threatened and Endangered Waters (1 records)

View Map of All Threatened and Endangered Waters

Reach ID	Stream Name	T&E Waters Species			View Map
		Different Species	Highest TE*	Highest Tier**	
301010110653	Glade Creek	1	FESE	I	Yes

Cold Water Stream Survey (Trout Streams)

Managed Trout Species

N/A

Scientific Collections (8 records

View Map of All Query Results
Scientific Collections

Collection	Date Collected	Collector	Collection Species			View Map
			Different Species	Highest TE*	Highest Tier**	
308079	Aug 29 2004	Thomas Hays	3			Yes
308078	Jul 10 2004	Thomas Hays	2			Yes
308077	Mar 27 2004	Thomas Hays	2			Yes
303257	Aug 29 2003	Thomas Hays	1			Yes
303233	Jun 16 2003	Thomas Hays	1			Yes
303218	Apr 1 2003	Thomas Hays	2			Yes
303216	Mar 29 2003	Thomas Hays	1			Yes
21152	Jan 1 1900		1			Yes

Biologist Observations (1 records)

View Map of All Query Results
Biologist Observations

Obs ID	Date	Observer	BOVA Code	Status*	Tier**	Common Name	Scientific Name	View Map
297	3/21/1996	M. Duval	050054			Woodchuck	Marmota monax monax	Yes

Virginia Breeding Bird Atlas Blocks (1 records)

View Map of All Query Results
Virginia Breeding Bird Atlas Blocks

BBA ID	Atlas Quadrangle Block Name	Breeding Bird Atlas Species			View Map
		Different Species	Highest TE*	Highest Tier**	
32076	Stewartsville, SE	66		IV	Yes

USFWS Breeding Bird Survey Routes (1 records)

View Map of All Query Results
USFWS Breeding Bird Survey Routes

BBS ID	Route Name	Breeding Bird Survey Species			View Map
		Different Species	Highest TE*	Highest Tier**	
88017	FINCASTLE	96	ST	I	Yes

Christmas Bird Count Survey (2 records)

View Map of All Query Results
Christmas Bird Count Survey

CBC ID	Survey Name	Christmas Bird Count Species			View Map
		Different Species	Highest TE*	Highest Tier**	
880021	Roanoke	117	FSST	I	Yes
880022	Roanoke	129	FSSE	I	Yes

Public Holdings: (1 names)

Name	Agency	Level
Blue Ridge Parkway National Park	National Park Service	Federal

USGS 7.5' Quadrangles:
Stewartsville

Va. NRCS Watersheds:
TINKER CREEK/CARVIN CREEK/GLADE CREEK
ROANOKE RIVER/MASON CREEK
ROANOKE RIVER/SMITH MOUNTAIN LAKE/BEAVERDAM CREEK

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- Site tested using browsers Firefox 2.0, Firefox 3.0, IE 6, IE 7, and Opera 9.2 DEQ5 I 229400 undefined
- W3C HTML validation <BASE href="http://vafwis.org/fwis/NewPages/">VaFWIS_report_search.asp

37,17,58.9 -79,50,13.0
is **the Search Point**

Show Position Rings
Yes No
1 mile and 1/4 mile at the **Search Point**

Show Search Area
Yes No
2 miles

Search Point is at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Search, BBA, BBS, CBC, Collections, ObsBook

Map Overlay Legend
- 2 mile radius Search Area
- Data Collection Site
- Selected Site

Virginia Fish and Wildlife Information Service

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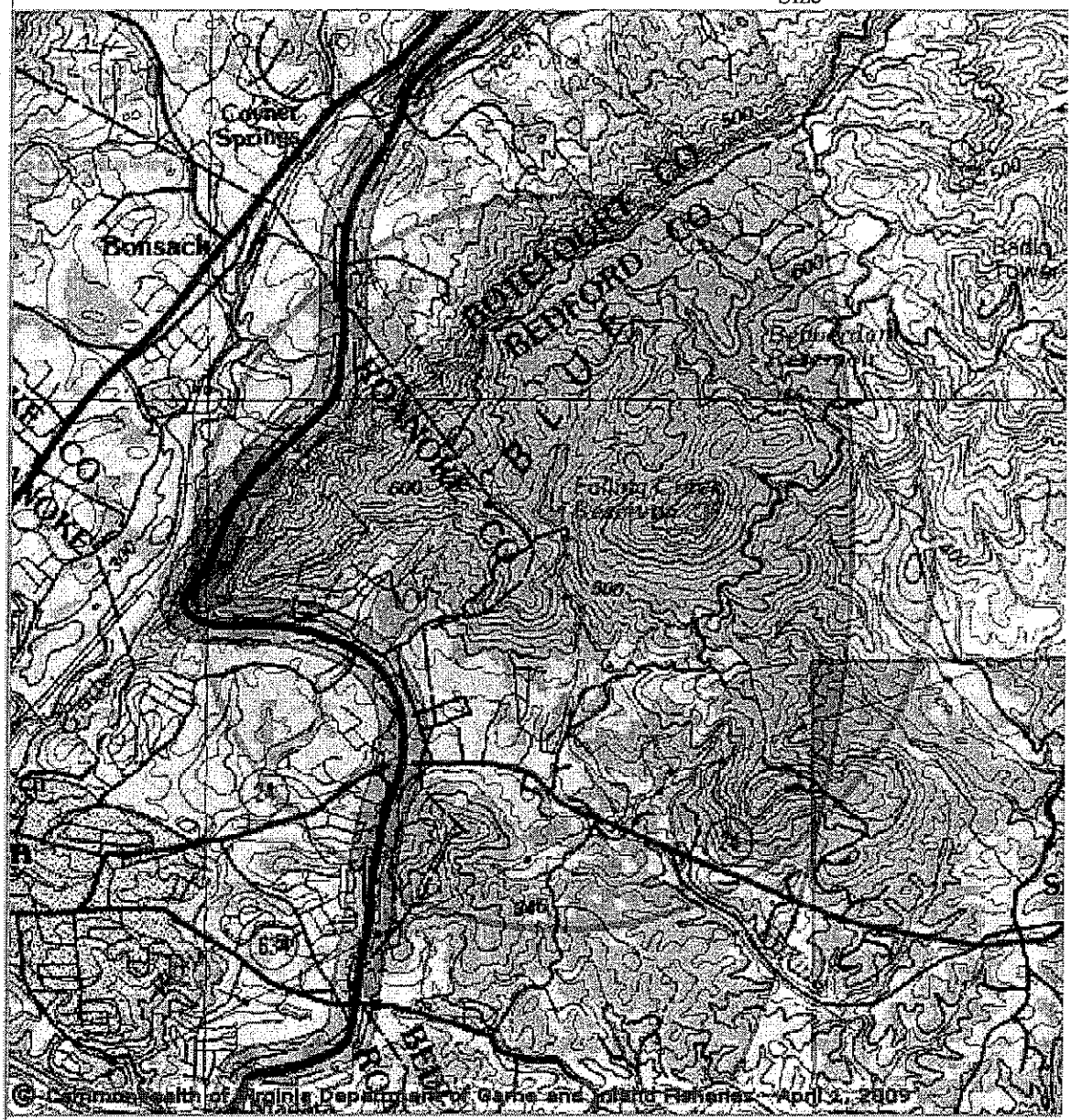
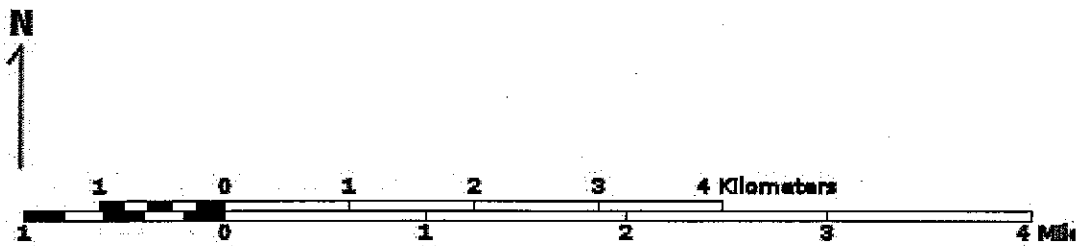
Map Click: Pan | Map Scale: In Zoom Out | Screen Size: Small Size





Point of Search 37,17,58.9 -79,50,13.0
Map Location 37,17,58.9 -79,50,13.0

Select **Coordinate System:** Degrees,Minutes,Seconds Latitude - Longitude
Decimal Degrees Latitude - Longitude
Meters UTM NAD83 East North Zone
Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see terraserver-usa.com for details)

Map projection is UTM Zone 17 NAD 1983 with left 598298 and top 4133571. Pixel size is 16 meters . Coordinates displayed are Degrees, Minutes, Seconds North and West.Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixles. The map display represents 9600 meters east to west b 9600 meters north to south for a total of 92.1 square kilometers. The map display represents 31501 feet e to west by 31501 feet north to south for a total of 35.5 square miles.

Black and white aerial photography aquired near 1990 and topographic maps are from the United States Department of the Interior, United States Geological Survey.
Shaded topographic maps are from TOPO! ©2006 National Geographic
http://www.nationa.geographic.com/topo
Color aerial photography aquired 2002 is from Virginia Base Mapping Program, Virginia Geographic Information Network
All other map products are from the Commonwealth of Virginia Department of Game and Inland Fisheri

map assembled 2009-04-01 15:23:49 (qa/qc February 5, 2009 11:28 - tn=229400 dist=3218 I)

Attachment F

Effluent Data

Falling Creek WFP (VA0001465)

Effluent pH (S.U.)

Date Due	min	max
10-Oct-04	6.3	6.5
10-Nov-04	6.3	6.6
10-Dec-04	6.3	6.5
10-Jan-05	6.2	6.4
10-Feb-05	6.2	6.6
10-Mar-05	6.2	6.4
10-Apr-05	6.3	6.6
10-May-05	6.4	6.7
10-Jun-05	6	6.5
10-Jul-05	6.3	6.5
10-Aug-05	6.3	6.7
10-Sep-05	6.3	6.6
10-Oct-05	6.4	6.5
10-Nov-05	6.4	6.6
10-Dec-05	6.4	6.9
10-Jan-06	6.6	6.9
10-Feb-06	6.6	6.9
10-Mar-06	6.5	6.7
10-Apr-06	6	6.7
10-May-06	6	6.7
10-Jun-06	6	6.6
10-Jul-06	6	6.6
10-Aug-06	6	6.6
10-Sep-06	6	6.8
10-Oct-06	6	6.8
10-Nov-06	6	6.8
10-Dec-06	6	6.5
10-Jan-07	6	6.7
10-Feb-07	6	6.5
10-Mar-07	6	6.4
10-Apr-07	6	6.3
10-May-07	6	6.2
10-Jun-07	6.1	6.3
10-Jul-07	6.1	7.9
10-Aug-07	6.2	6.5
10-Sep-07	6.3	6.6
10-Oct-07	6.3	6.6
10-Nov-07	6.1	6.5
10-Dec-07	6.3	6.7
10-Jan-08	6	6.6
10-Feb-08	6.1	6.8
10-Mar-08	6.1	7.5
10-Apr-08	6.1	6.9
10-May-08	6.4	6.9
10-Jun-08	6.1	6.9
10-Jul-08	6.4	7.1
10-Aug-08	6.2	7
10-Sep-08	6.4	7.1
10-Oct-08	7.2	6.7
10-Nov-08	6.4	7.1
10-Dec-08	6.3	7.2
10-Jan-09	6.3	7
10-Feb-09	6.3	7
10-Mar-09	6	6.9
10-Apr-09	6.1	6.9

90th Percentile pH	7.1	S.U.
10th Percentile pH	6.0	S.U.

Falling Creek WFP
VPDES Permit No. VA0001465

Copper Monitoring Data (grab)

Date	Dissolved Copper (ug/L)
8/21/2002	25
10/11/2002	5
10/25/2002	19
12/31/2002	10
2/25/2003	11
8/27/2003	<5.0
10/17/2003	<5.0
4/2/2004	10
11/24/2004	6**
2/24/2005	5.4
9/3/2005	6.2

** duplicate grab <5 ug/L and 7 ug/L detected in field blank grab not used in analysis

4/14/2009 2:31:05 PM

Facility = Falling Creek Water Filtration Plant
Chemical = copper, dissolved (ug/L)
Chronic averaging period = 4
WLAa = 3.94
WLAc = 3.6
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 9.29854 (expected effluent as to determine background level in perennial section)
Variance = 31.1266
C.V. = 0.6
97th percentile daily values = 22.6272
97th percentile 4 day average = 15.4708
97th percentile 30 day average= 11.2145
< Q.L. = 2
Model used = BPJ Assumptions, Type 1 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 3.94
Average Weekly limit = 3.94
Average Monthly LImit = 3.94

The data are:

25
5
19
10
11
0
0
10
5.4
6.2

Falling Creek WFP
VA0001465

Antidegradation Background Calculations
(0.029 MGD facility prior to 1999 increase in flow)

Background in perennial section of stream estimated with effluent dissolved copper data collected from 2002 - 2005.
30 day maximum average flow from 1994 used in the calculation of background.
Upstream data collected from 1994 through 1998 used to calculate expected upstream concentration
Background stream concentration prior to increase in flow = effluent concentration + upstream concentration
Existing stream concentrations determined during acute and chronic flow conditions.
Low stream flows taken from current permit because no data available for 1994.

Qex=(QsCs + QeCe)/(Qs+Qe)

Parameter dissolved copper

Expected Value stream	0	ug/L	Effluent 30 day max average flow	0.029	MGD
Expected Value effluent	9.29854	ug/L			

low flow 1Q10	0.3	MGD
low flow 7Q10	0.3	MGD
30Q5	0.5	MGD

Low Flow Conditions

acute	**0.82**	ug/L
chronic	**0.82**	ug/L
human health	**0.51**	ug/L

Falling Creek WFP
VA0001465

VPDES Permit Application Flow Rates

Permit Application Data for Reissuance Date	30-Day Max Average (MGD)	Long Term Average (MGD)
2009	0.100	0.067
2004	0.134	0.064
1999	0.123	0.098
1994	0.029	0.024
1989	0.036	0.032

Falling Creek WFP (VA0001465)

Effluent Hardness (Outfall 001)

Date	Hardness as $CaCO_3$ (mg/L)
2/25/2009	16
2/26/2009	12
2/27/2009	12
12/11/2008	32
12/19/2008	40
12/23/2008	32
12/30/2008	30
11/4/2008	8
11/5/2008	16
11/6/2008	16
11/7/2008	12
10/14/2008	12
10/15/2008	16
10/17/2008	16
12/12/2005	11.4
12/14/2005	10.9
12/16/2005	10.8
8/2/2005	14.7
8/4/2005	18.9
8/6/2005	15.6
1/27/2005	12.8
1/29/2005	13.0
1/31/2005	13.6
1/27/2005	12.8
1/28/2005	13.0
1/29/2005	13.6
8/21/2002	20
10/25/2002	19
2/25/2003	24
1/26/2004	11.2
1/28/2004	12.0
1/30/2004	12.9
10/13/2003	13.9
10/15/03	20.9
10/17/2003	16.7
10/22/2002	20
10/23/2002	28
10/24/2002	16
10/24/2001	16
10/26/2001	12
10/28/2001	16
5/9/2000	68
5/10/2000	52
5/12/2000	68
10/31/2000	28
11/2/2000	24
11/5/2000	28
8/1/2000	76
8/2/2000	56
8/4/2000	88
2/3/2000	41
2/5/2000	32
2/8/2000	27
11/13/1999	29
11/5/1999	36
11/8/1999	25
mean	24

Falling Creek WFP
VA0001465

Falling Creek (Above Outfall)

Collection Date	Hardness as $CaCO_3$ (mg/L)
11/21/08	68
12/29/08	110
12/23/08	106
12/30/08	100

mean 96 mg/L

Falling Creek Water Filter Plant Temperature (°F) in Raw Water

	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04
Day													
1	54	60.4	63	67	70.9	72.6	64.8	58.0	49.6	44	45.0	46.2	53.0
2	54	60.4	63.7	68	70.9	72.8	63	59.1	49.0	44	45.0	46.7	52.6
3	54	62	62.7	68	71	72.6	62.8	59.5	48.0	44.8	45.0	48.4	52.0
4	56	62	62	68	71	71	63	59.9	48.0	46.8	45.0	49.3	52.0
5	54	62	62	68	72.2	71.6	61	60.5	47.0	46.6	45.0	49.3	51.8
6	54	62	63	67.5	70.7	70	61.9	61.6	46.0	47.7	44.0	51.4	51.8
7	54	61	64	68	70	70	62.4	61.8	46.0	45	45.0	53.4	52.9
8	54	61	64.5	68.6	69	70	66	60.6	45.5	45.2	45.0	52.6	53.3
9	53	62	65	69.5	68	69	63	58.6	45.3	44.6	45.0	51.2	55.0
10	53.5	62	65	70	68.5	69	63	57.2	45.2	43.8	45.0	50.3	55.0
11	53	63.3	65.1	69.8	67.7	69	63	56.4	45.5	44.7	45.0	49.6	55.5
12	53	63	65.6	70.2	67.4	68	63	56.7	45.6	44.6	45.0	49.6	55.1
13	54	63.7	65	70.1	67.4	68	64	56.4	44.6	44.2	45.0	49.9	54.4
14	54	63.6	65	70	67	68	64	54.9	44.6	44.2	45.0	49.9	52.9
15	54.8	63.5	65	70.5	68.5	68	62.4	53.6	44	44.5	45.0	51.7	52.9
16	56	63.5	65	70	68.6	68	61.6	53.0	43.6	44	45.0	52.0	53.8
17	56.2	62	64.4	70	69	67.9	61.4	52.9	44	43.5	45.0	51.0	55.2
18	56	62.3	64	72	69	66.4	60.8	54.8	44	44.3	45.0	50.4	56.4
19	54	60.5	64	72	69	66	62.8	54.4	44	44	47.0	51.2	61.4
20	54.6	60.4	65	72	69.9	66	62	54.4	42.3	44	47.0	51.4	61
21	54.7	60.7	65	72	70.2	67	60.4	54.0	42.3	44	47.0	52.0	59
22	55.3	60.9	65	72	70	67	59	54.0	41.5	43	47.0	51.9	60.6
23	57	60.9	65	72.2	71	67.2	60	53.9	43.7	41.9	47.0	50.6	62.3
24	57.5	61.2	66	72.2	71	67	58.9	53.4	45.1	41.9	47.0	50.6	62.5
25	57.8	61.9	66	72	71	67	58.3	52.4	42.8	42.2	47.0	50.8	61.8
26	57	61	66	72	71.9	69	58.5	52.0	42.7	42.3	47.0	52.7	62.0
27	58	61.5	67	72.4	72	68	57.9	51.0	42.8	42.3	47.0	55.8	55
28	60	61.7	67	72.5	73	68	58	51.0	42.6	42.6	47.0	55.0	56.4
29	58	61.8	67	73.1	72.9	65	58	51.0	42.5	42.5	48.0	55.0	56.3
30	58	62.7	67	71	73.3	65	57	50.0	44	42.5		55.0	56.2
31		63		71	73.9		57		44			53.0	
Average	***55***	***62***	***65***	***70***	***70***	***68***	***61***	***56***	***45***	***44***	***46***	***51***	***56***

90th Percentile Temperature 70 °F= **21.1 °C**
90th Percentile Temperature 62 °F= **16.7 °C** Jan. - May

Attachment G

Wasteload and Limit Calculations

- **Wasteload Allocation Spreadsheet (Intermittent Section)**
- **Antidegradation Wasteload Allocation Spreadsheets (Perennial Section)**
- **STATS Program Results (Cu,TRC)**

Mixing Zone Predictions for Falling Creek WFP (perennial)

Effluent Flow = 0.1 MGD
Stream 7Q10 = 0.8 MGD
Stream 30Q10 = 1.0 MGD
Stream 1Q10 = 0.3 MGD
Stream slope = 0.00952 ft/ft
Stream width = 15 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .2055 ft
Length = 789. ft
Velocity = .452 ft/sec
Residence Time = .0202 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .2321 ft
Length = 711.05 ft
Velocity = .4891 ft/sec
Residence Time = .0168 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1258 ft
Length = 1195.56 ft
Velocity = .3281 ft/sec
Residence Time = 1.012 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 98.81% of the 1Q10 is used.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Falling Creek WFP Permit No.: VA0001465

Receiving Stream: Falling Creek intermittent section Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	96 mg/L
90% Temperature (Annual) =	23 deg C
90% Temperature (Wet season) =	16 deg C
90% Maximum pH =	8.6 SU
10% Maximum pH =	7 SU
Tier Designation (1 or 2) =	1
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0 MGD
7Q10 (Annual) =	0 MGD
30Q10 (Annual) =	0 MGD
1Q10 (Wet season) =	0 MGD
30Q10 (Wet season)	0 MGD
30Q5 =	0 MGD
Harmonic Mean =	0 MGD
Annual Average =	0 MGD

Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO3) =	25 mg/L
90% Temp (Annual) =	21.1 deg C
90% Temp (Wet season) =	16.7 deg C
90% Maximum pH =	7.1 SU
10% Maximum pH =	6 SU
Discharge Flow =	0.1 MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	2.7E+03	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03
Acrolein	0	--	--	na	7.8E+02	--	--	na	7.8E+02	--	--	--	--	--	--	--	--	--	--	na	7.8E+02
Acrylonitrile [C]	0	--	--	na	6.6E+00	--	--	na	6.6E+00	--	--	--	--	--	--	--	--	--	--	na	6.6E+00
Aldrin [C]	0	3.0E+00	--	na	1.4E-03	3.0E+00	--	na	1.4E-03	--	--	--	--	--	--	--	--	3.0E+00	--	na	1.4E-03
Ammonia-N (mg/l) (Yearly)	0	3.29E+01	3.71E+00	na	--	3.3E+01	3.7E+00	na	--	--	--	--	--	--	--	--	--	3.3E+01	3.7E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	3.29E+01	4.92E+00	na	--	3.3E+01	4.9E+00	na	--	--	--	--	--	--	--	--	--	3.3E+01	4.9E+00	na	--
Anthracene	0	--	--	na	1.1E+05	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
Antimony	0	--	--	na	4.3E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	7.1E+02	--	--	na	7.1E+02	--	--	--	--	--	--	--	--	--	--	na	7.1E+02
Benzidine [C]	0	--	--	na	5.4E-03	--	--	na	5.4E-03	--	--	--	--	--	--	--	--	--	--	na	5.4E-03
Benzo (a) anthracene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (b) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (k) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (a) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	--	--	na	1.7E+05
Bromoform [C]	0	--	--	na	3.6E+03	--	--	na	3.6E+03	--	--	--	--	--	--	--	--	--	--	na	3.6E+03
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	5.2E+03	--	--	--	--	--	--	--	--	--	--	na	5.2E+03
Cadmium	0	8.2E-01	3.8E-01	na	--	8.2E-01	3.8E-01	na	--	--	--	--	--	--	--	--	--	8.2E-01	3.8E-01	na	--
Carbon Tetrachloride [C]	0	--	--	na	4.4E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	2.2E-02	2.4E+00	4.3E-03	na	2.2E-02	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	2.2E-02
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	3.4E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
Chloroform [C]	0	--	--	na	2.9E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04
2-Chloronaphthalene	0	--	--	na	4.3E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
2-Chlorophenol	0	--	--	na	4.0E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	--	--	na	4.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	1.8E+02	2.4E+01	na	--	1.8E+02	2.4E+01	na	--	--	--	--	--	--	--	--	--	1.8E+02	2.4E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Copper	0	3.6E+00	2.7E+00	na	--	3.6E+00	2.7E+00	na	--	--	--	--	--	--	--	--	--	3.6E+00	2.7E+00	na	--
Cyanide	0	2.2E+01	5.2E+00	na	2.2E+05	2.2E+01	5.2E+00	na	2.2E+05	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	2.2E+05
DDD [C]	0	--	--	na	8.4E-03	--	--	na	8.4E-03	--	--	--	--	--	--	--	--	--	--	na	8.4E-03
DDE [C]	0	--	--	na	5.9E-03	--	--	na	5.9E-03	--	--	--	--	--	--	--	--	--	--	na	5.9E-03
DDT [C]	0	1.1E+00	1.0E-03	na	5.9E-03	1.1E+00	1.0E-03	na	5.9E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	5.9E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Dibutyl phthalate	0	--	--	na	1.2E+04	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Dichloromethane (Methylene Chloride) [C]	0	--	--	na	1.6E+04	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	--	--	na	1.6E+04
1,2-Dichlorobenzene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,3-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,4-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
3,3-Dichlorobenzidine[C]	0	--	--	na	7.7E-01	--	--	na	7.7E-01	--	--	--	--	--	--	--	--	--	--	na	7.7E-01
Dichlorobromomethane [C]	0	--	--	na	4.6E+02	--	--	na	4.6E+02	--	--	--	--	--	--	--	--	--	--	na	4.6E+02
1,2-Dichloroethane [C]	0	--	--	na	9.9E+02	--	--	na	9.9E+02	--	--	--	--	--	--	--	--	--	--	na	9.9E+02
1,1-Dichloroethylene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,2-trans-dichloroethylene	0	--	--	na	1.4E+05	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	--	--	na	1.4E+05
2,4-Dichlorophenol	0	--	--	na	7.9E+02	--	--	na	7.9E+02	--	--	--	--	--	--	--	--	--	--	na	7.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	3.9E+02	--	--	na	3.9E+02	--	--	--	--	--	--	--	--	--	--	na	3.9E+02
1,3-Dichloropropene	0	--	--	na	1.7E+03	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dieldrin [C]	0	2.4E-01	5.6E-02	na	1.4E-03	2.4E-01	5.6E-02	na	1.4E-03	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	1.4E-03
Diethyl Phthalate	0	--	--	na	1.2E+05	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	--	--	na	1.2E+05
Di-2-Ethylhexyl Phthalate [C]	0	--	--	na	5.9E+01	--	--	na	5.9E+01	--	--	--	--	--	--	--	--	--	--	na	5.9E+01
2,4-Dimethylphenol	0	--	--	na	2.3E+03	--	--	na	2.3E+03	--	--	--	--	--	--	--	--	--	--	na	2.3E+03
Dimethyl Phthalate	0	--	--	na	2.9E+06	--	--	na	2.9E+06	--	--	--	--	--	--	--	--	--	--	na	2.9E+06
Di-n-Butyl Phthalate	0	--	--	na	1.2E+04	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
2,4 Dinitrophenol	0	--	--	na	1.4E+04	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	7.65E+02	--	--	na	7.7E+02	--	--	--	--	--	--	--	--	--	--	na	7.7E+02
2,4-Dinitrotoluene [C]	0	--	--	na	9.1E+01	--	--	na	9.1E+01	--	--	--	--	--	--	--	--	--	--	na	9.1E+01
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	na	1.2E-06	--	--	na	na	--	--	--	--	--	--	--	--	--	--	na	na
1,2-Diphenylhydrazine[C]	0	--	--	na	5.4E+00	--	--	na	5.4E+00	--	--	--	--	--	--	--	--	--	--	na	5.4E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.4E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.4E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.4E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.4E+02
Endosulfan Sulfate	0	--	--	na	2.4E+02	--	--	na	2.4E+02	--	--	--	--	--	--	--	--	--	--	na	2.4E+02
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	8.6E-02	3.6E-02	na	8.1E-01	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	8.1E-01
Endrin Aldehyde	0	--	--	na	8.1E-01	--	--	na	8.1E-01	--	--	--	--	--	--	--	--	--	--	na	8.1E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.9E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04
Fluoranthene	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	3.7E+02
Fluorene	0	--	--	na	1.4E+04	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	2.1E-03	5.2E-01	3.8E-03	na	2.1E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	2.1E-03
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	1.1E-03	5.2E-01	3.8E-03	na	1.1E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	1.1E-03
Hexachlorobenzene [C]	0	--	--	na	7.7E-03	--	--	na	7.7E-03	--	--	--	--	--	--	--	--	--	--	na	7.7E-03
Hexachlorobutadiene [C]	0	--	--	na	5.0E+02	--	--	na	5.0E+02	--	--	--	--	--	--	--	--	--	--	na	5.0E+02
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	1.3E-01	--	--	na	1.3E-01	--	--	--	--	--	--	--	--	--	--	na	1.3E-01
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	4.6E-01	--	--	na	4.6E-01	--	--	--	--	--	--	--	--	--	--	na	4.6E-01
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	6.3E-01	9.5E-01	--	na	6.3E-01	--	--	--	--	--	--	--	--	9.5E-01	--	na	6.3E-01
Hexachlorocyclopentadiene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
Hexachloroethane [C]	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	--	--	na	8.9E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone [C]	0	--	--	na	2.6E+04	--	--	na	2.6E+04	--	--	--	--	--	--	--	--	--	--	na	2.6E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	2.09	2.0E+01	2.3E+00	na	--	2.0E+01	2.3E+00	na	--	--	--	--	--	--	--	--	--	2.0E+01	2.3E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0.081	1.4E+00	7.7E-01	na	5.1E-02	1.4E+00	7.7E-01	na	5.1E-02	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	na	5.1E-02
Methyl Bromide	0	--	--	na	4.0E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Monochlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
Nickel	4.77	5.6E+01	6.3E+00	na	4.6E+03	5.6E+01	6.3E+00	na	4.6E+03	--	--	--	--	--	--	--	--	5.6E+01	6.3E+00	na	4.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
N-Nitrosodimethylamine [C]	0	--	--	na	8.1E+01	--	--	na	8.1E+01	--	--	--	--	--	--	--	--	--	--	na	8.1E+01
N-Nitrosodiphenylamine [C]	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
N-Nitrosodi-n-propylamine [C]	0	--	--	na	1.4E+01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB-1016	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1221	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1232	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1242	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1248	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1254	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1260	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB Total [C]	0	--	--	na	1.7E-03	--	--	na	1.7E-03	--	--	--	--	--	--	--	--	--	--	na	1.7E-03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Pentachlorophenol [C]	0	3.2E+00	2.4E+00	na	8.2E+01	3.2E+00	2.4E+00	na	8.2E+01	--	--	--	--	--	--	--	--	3.2E+00	2.4E+00	na	8.2E+01
Phenol	0	--	--	na	4.6E+06	--	--	na	4.6E+06	--	--	--	--	--	--	--	--	--	--	na	4.6E+06
Pyrene	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Radionuclides (pCi/l except Beta/Photon)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity	0	--	--	na	1.5E+01	--	--	na	1.5E+01	--	--	--	--	--	--	--	--	--	--	na	1.5E+01
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Strontium-90	0	--	--	na	8.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Tritium	0	--	--	na	2.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
Selenium	0.828	2.0E+01	5.0E+00	na	1.1E+04	2.0E+01	5.0E+00	na	1.1E+04	--	--	--	--	--	--	--	--	2.0E+01	5.0E+00	na	1.1E+04
Silver	1.103	3.2E-01	--	na	--	3.2E-01	--	na	--	--	--	--	--	--	--	--	--	3.2E-01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	1.1E+02	--	--	na	1.1E+02	--	--	--	--	--	--	--	--	--	--	na	1.1E+02
Tetrachloroethylene[C]	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	--	--	na	8.9E+01
Thallium	0	--	--	na	6.3E+00	--	--	na	6.3E+00	--	--	--	--	--	--	--	--	--	--	na	6.3E+00
Toluene	0	--	--	na	2.0E+05	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	--	--	na	2.0E+05
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	7.5E-03	7.3E-01	2.0E-04	na	7.5E-03	--	--	--	--	--	--	--	--	7.3E-01	2.0E-04	na	7.5E-03
Tributyltin	0	4.6E-01	6.3E-02	na	--	4.6E-01	6.3E-02	na	--	--	--	--	--	--	--	--	--	4.6E-01	6.3E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	9.4E+02	--	--	na	9.4E+02	--	--	--	--	--	--	--	--	--	--	na	9.4E+02
1,1,2-Trichloroethane[C]	0	--	--	na	4.2E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Trichloroethylene [C]	0	--	--	na	8.1E+02	--	--	na	8.1E+02	--	--	--	--	--	--	--	--	--	--	na	8.1E+02
2,4,6-Trichlorophenol [C]	0	--	--	na	6.5E+01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	--	--	na	6.5E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride[C]	0	--	--	na	6.1E+01	--	--	na	6.1E+01	--	--	--	--	--	--	--	--	--	--	na	6.1E+01
Zinc	19.31	3.6E+01	3.6E+01	na	6.9E+04	3.6E+01	3.6E+01	na	6.9E+04	--	--	--	--	--	--	--	--	3.6E+01	3.6E+01	na	6.9E+04

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	4.3E+03
Arsenic	9.0E+01
Barium	na
Cadmium	2.3E-01
Chromium III	1.4E+01
Chromium VI	6.4E+00
Copper	1.5E+00
Iron	na
Lead	1.4E+00
Manganese	na
Mercury	5.1E-02
Nickel	3.8E+00
Selenium	3.0E+00
Silver	1.3E-01
Zinc	1.4E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

0.100 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD 0.100

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.000	0.000	0.100	0.100
7Q10	0.000	N/A	0.100	N/A
30Q10	0.000	0.000	0.100	0.100
30Q5	0.000	N/A	0.100	N/A
Harm. Mean	0.000	N/A	0.100	N/A
Annual Avg.	0.000	N/A	0.100	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	21.100	16.700
30Q10 90th% Temp. Mix (deg C)	21.100	16.700
1Q10 90th% pH Mix (SU)	7.100	7.100
30Q10 90th% pH Mix (SU)	7.100	7.100
1Q10 10th% pH Mix (SU)	6.000	N/A
7Q10 10th% pH Mix (SU)	6.000	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	25.0	25.0
7Q10 Hardness (mg/L as CaCO3)	25.0	25.0

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.100
(7.204 - pH)	0.104
(pH - 7.204)	-0.104
Trout Present Criterion (mg N/l	21.945
Trout Absent Criterion (mg N/L	32.861
Trout Present?	n
Effective Criterion (mg N/L)	32.861

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	21.100
90th Percentile pH (SU)	7.100
MIN	1.865
MAX	21.100
(7.688 - pH)	0.588
(pH - 7.688)	-0.588
Early LS Present Criterion (mg N	3.707
Early LS Absent Criterion (mg N/	3.707
Early Life Stages Present?	y
Effective Criterion (mg N/L)	3.707

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.100
(7.204 - pH)	0.104
(pH - 7.204)	-0.104
Trout Present Criterion (mg N/l	21.945
Trout Absent Criterion (mg N/L	32.861
Trout Present?	n
Effective Criterion (mg N/L)	32.861

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	16.700
90th Percentile pH (SU)	7.100
MIN	2.476
MAX	16.700
(7.688 - pH)	0.588
(pH - 7.688)	-0.588
Early LS Present Criterion (mg N	4.924
Early LS Absent Criterion (mg N/	4.924
Early Life Stages Present?	y
Effective Criterion (mg N/L)	4.924

0.100 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGD 0.100

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.000	0.000	0.100	0.100
7Q10	0.000	N/A	0.100	N/A
30Q10	0.000	0.000	0.100	0.100
30Q5	0.000	N/A	0.100	N/A
Harm. Mean	0.000	N/A	0.100	N/A
Annual Avg.	0.000	N/A	0.100	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	21.100	16.700
30Q10 90th% Temp. Mix (deg C)	21.100	16.700
1Q10 90th% pH Mix (SU)	7.100	7.100
30Q10 90th% pH Mix (SU)	7.100	7.100
1Q10 10th% pH Mix (SU)	6.000	N/A
7Q10 10th% pH Mix (SU)	6.000	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	25.000	25.000
7Q10 Hardness (mg/L as CaCO3) =	25.000	25.000

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.100
(7.204 - pH)	0.104
(pH - 7.204)	-0.104
Trout Present Criterion (mg N/l	21.945
Trout Absent Criterion (mg N/L	32.861
Trout Present?	n
Effective Criterion (mg N/L)	32.861

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	21.100
90th Percentile pH (SU)	7.100
MIN	1.865
MAX	21.100
(7.688 - pH)	0.588
(pH - 7.688)	-0.588
Early LS Present Criterion (mg N	3.707
Early LS Absent Criterion (mg N/	3.707
Early Life Stages Present?	y
Effective Criterion (mg N/L)	3.707

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.100
(7.204 - pH)	0.104
(pH - 7.204)	-0.104
Trout Present Criterion (mg N/l	21.945
Trout Absent Criterion (mg N/L	32.861
Trout Present?	n
Effective Criterion (mg N/L)	32.861

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	16.700
90th Percentile pH (SU)	7.100
MIN	2.476
MAX	16.700
(7.688 - pH)	0.588
(pH - 7.688)	-0.588
Early LS Present Criterion (mg N	4.924
Early LS Absent Criterion (mg N/	4.924
Early Life Stages Present?	y
Effective Criterion (mg N/L)	4.924

Falling Creek WFP
VA0001465

Antidegradation Background Calculations
(0.029 MGD facility prior to 1999 increase in flow)

Background in perennial section of stream estimated with effluent dissolved copper data collected from 2002 - 2004.
30 day maximum average flow from 1994 used in the calculation of background.
Upstream data collected from 1994 through 1998 used to calculate expected upstream concentration
Background stream concentration prior to increase in flow = effluent concentration + upstream concentration
Existing stream concentrations determined during acute and chronic flow conditions.
Low stream flows taken from current permit because no data available for 1994.

Qex=(QsCs + QeCe)/(Qs+Qe)

Parameter dissolved copper

Expected Value stream	0	ug/L	Effluent 30 day max average flow	0.029 MGD
Expected Value effluent	9.29854	ug/L		

low flow 1Q10	0.3	MGD
low flow 7Q10	0.3	MGD
30Q5	0.5	MGD

Low Flow Conditions		
acute	**0.82**	ug/L
chronic	**0.82**	ug/L
human health	**0.51**	ug/L

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Falling Creek WFP Permit No.: VA0001465

Receiving Stream: Falling Creek perennial section (antidegradation) Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	96 mg/L
90% Temperature (Annual) =	23 deg C
90% Temperature (Wet season) =	16 deg C
90% Maximum pH =	8.6 SU
10% Maximum pH =	7 SU
Tier Designation (1 or 2) =	2
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0.3 MGD
7Q10 (Annual) =	0.3 MGD
30Q10 (Annual) =	0.4 MGD
1Q10 (Wet season) =	0.7 MGD
30Q10 (Wet season)	1 MGD
30Q5 =	0.5 MGD
Harmonic Mean =	1 MGD
Annual Average =	MGD

Mixing Information

Annual - 1Q10 Mix =	98.81 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO3) =	25 mg/L
90% Temp (Annual) =	21.1 deg C
90% Temp (Wet season) =	16.7 deg C
90% Maximum pH =	7.1 SU
10% Maximum pH =	6 SU
Discharge Flow =	0.1 MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	2.7E+03	--	--	na	1.6E+04	--	--	na	2.7E+02	--	--	na	1.6E+03	--	--	na	1.6E+03
Acrolein	0	--	--	na	7.8E+02	--	--	na	4.7E+03	--	--	na	7.8E+01	--	--	na	4.7E+02	--	--	na	4.7E+02
Acrylonitrile [C]	0	--	--	na	6.6E+00	--	--	na	7.3E+01	--	--	na	6.6E-01	--	--	na	7.3E+00	--	--	na	7.3E+00
Aldrin [C]	0	3.0E+00	--	na	1.4E-03	1.2E+01	--	na	1.5E-02	7.5E-01	--	na	1.4E-04	3.0E+00	--	na	1.5E-03	3.0E+00	--	na	1.5E-03
Ammonia-N (mg/l) (Yearly)	0	1.55E+01	2.01E+00	na	--	6.1E+01	1.0E+01	na	--	3.84E+00	5.03E-01	na	--	1.5E+01	2.5E+00	na	--	1.5E+01	2.5E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	9.83E+00	2.13E+00	na	--	7.9E+01	2.3E+01	na	--	2.46E+00	5.33E-01	na	--	2.0E+01	5.9E+00	na	--	2.0E+01	5.9E+00	na	--
Anthracene	0	--	--	na	1.1E+05	--	--	na	6.6E+05	--	--	na	1.1E+04	--	--	na	6.6E+04	--	--	na	6.6E+04
Antimony	0	--	--	na	4.3E+03	--	--	na	2.6E+04	--	--	na	4.3E+02	--	--	na	2.6E+03	--	--	na	2.6E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	1.3E+03	6.0E+02	na	--	8.5E+01	3.8E+01	na	--	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Benzene [C]	0	--	--	na	7.1E+02	--	--	na	7.8E+03	--	--	na	7.1E+01	--	--	na	7.8E+02	--	--	na	7.8E+02
Benzidine [C]	0	--	--	na	5.4E-03	--	--	na	5.9E-02	--	--	na	5.4E-04	--	--	na	5.9E-03	--	--	na	5.9E-03
Benzo (a) anthracene [C]	0	--	--	na	4.9E-01	--	--	na	5.4E+00	--	--	na	4.9E-02	--	--	na	5.4E-01	--	--	na	5.4E-01
Benzo (b) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	5.4E+00	--	--	na	4.9E-02	--	--	na	5.4E-01	--	--	na	5.4E-01
Benzo (k) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	5.4E+00	--	--	na	4.9E-02	--	--	na	5.4E-01	--	--	na	5.4E-01
Benzo (a) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	5.4E+00	--	--	na	4.9E-02	--	--	na	5.4E-01	--	--	na	5.4E-01
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	8.4E+01	--	--	na	1.4E+00	--	--	na	8.4E+00	--	--	na	8.4E+00
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	1.0E+06	--	--	na	1.7E+04	--	--	na	1.0E+05	--	--	na	1.0E+05
Bromoform [C]	0	--	--	na	3.6E+03	--	--	na	4.0E+04	--	--	na	3.6E+02	--	--	na	4.0E+03	--	--	na	4.0E+03
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	3.1E+04	--	--	na	5.2E+02	--	--	na	3.1E+03	--	--	na	3.1E+03
Cadmium	0	3.0E+00	9.4E-01	na	--	1.2E+01	3.7E+00	na	--	7.4E-01	2.3E-01	na	--	3.0E+00	9.4E-01	na	--	3.0E+00	9.4E-01	na	--
Carbon Tetrachloride [C]	0	--	--	na	4.4E+01	--	--	na	4.8E+02	--	--	na	4.4E+00	--	--	na	4.8E+01	--	--	na	4.8E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	2.2E-02	9.5E+00	1.7E-02	na	2.4E-01	6.0E-01	1.1E-03	na	2.2E-03	2.4E+00	4.3E-03	na	2.4E-02	2.4E+00	4.3E-03	na	2.4E-02
Chloride	0	8.6E+05	2.3E+05	na	--	3.4E+06	9.2E+05	na	--	2.2E+05	5.8E+04	na	--	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	7.5E+01	4.4E+01	na	--	4.8E+00	2.8E+00	na	--	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	1.3E+05	--	--	na	2.1E+03	--	--	na	1.3E+04	--	--	na	1.3E+04

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	3.4E+02	--	--	na	3.7E+03	--	--	na	3.4E+01	--	--	na	3.7E+02	--	--	na	3.7E+02
Chloroform [C]	0	--	--	na	2.9E+04	--	--	na	3.2E+05	--	--	na	2.9E+03	--	--	na	3.2E+04	--	--	na	3.2E+04
2-Chloronaphthalene	0	--	--	na	4.3E+03	--	--	na	2.6E+04	--	--	na	4.3E+02	--	--	na	2.6E+03	--	--	na	2.6E+03
2-Chlorophenol	0	--	--	na	4.0E+02	--	--	na	2.4E+03	--	--	na	4.0E+01	--	--	na	2.4E+02	--	--	na	2.4E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	3.3E-01	1.6E-01	na	--	2.1E-02	1.0E-02	na	--	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--
Chromium III	0	4.7E+02	6.1E+01	na	--	1.8E+03	2.4E+02	na	--	1.2E+02	1.5E+01	na	--	4.7E+02	6.1E+01	na	--	4.7E+02	6.1E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	6.3E+01	4.4E+01	na	--	4.0E+00	2.8E+00	na	--	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Chrysene [C]	0	--	--	na	4.9E-01	--	--	na	5.4E+00	--	--	na	4.9E-02	--	--	na	5.4E-01	--	--	na	5.4E-01
Copper	0.82	1.1E+01	7.3E+00	na	--	4.0E+01	2.7E+01	na	--	3.3E+00	2.4E+00	na	--	1.1E+01	7.3E+00	na	--	1.1E+01	7.3E+00	na	--
Cyanide	0	2.2E+01	5.2E+00	na	2.2E+05	8.7E+01	2.1E+01	na	1.3E+06	5.5E+00	1.3E+00	na	2.2E+04	2.2E+01	5.2E+00	na	1.3E+05	2.2E+01	5.2E+00	na	1.3E+05
DDD [C]	0	--	--	na	8.4E-03	--	--	na	9.2E-02	--	--	na	8.4E-04	--	--	na	9.2E-03	--	--	na	9.2E-03
DDE [C]	0	--	--	na	5.9E-03	--	--	na	6.5E-02	--	--	na	5.9E-04	--	--	na	6.5E-03	--	--	na	6.5E-03
DDT [C]	0	1.1E+00	1.0E-03	na	5.9E-03	4.4E+00	4.0E-03	na	6.5E-02	2.8E-01	2.5E-04	na	5.9E-04	1.1E+00	1.0E-03	na	6.5E-03	1.1E+00	1.0E-03	na	6.5E-03
Demeton	0	--	1.0E-01	na	--	--	4.0E-01	na	--	--	2.5E-02	na	--	--	1.0E-01	na	--	--	1.0E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	4.9E-01	--	--	na	5.4E+00	--	--	na	4.9E-02	--	--	na	5.4E-01	--	--	na	5.4E-01
Dibutyl phthalate	0	--	--	na	1.2E+04	--	--	na	7.2E+04	--	--	na	1.2E+03	--	--	na	7.2E+03	--	--	na	7.2E+03
Dichloromethane (Methylene Chloride) [C]	0	--	--	na	1.6E+04	--	--	na	1.8E+05	--	--	na	1.6E+03	--	--	na	1.8E+04	--	--	na	1.8E+04
1,2-Dichlorobenzene	0	--	--	na	1.7E+04	--	--	na	1.0E+05	--	--	na	1.7E+03	--	--	na	1.0E+04	--	--	na	1.0E+04
1,3-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	1.6E+04	--	--	na	2.6E+02	--	--	na	1.6E+03	--	--	na	1.6E+03
1,4-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	1.6E+04	--	--	na	2.6E+02	--	--	na	1.6E+03	--	--	na	1.6E+03
3,3-Dichlorobenzidine[C]	0	--	--	na	7.7E-01	--	--	na	8.5E+00	--	--	na	7.7E-02	--	--	na	8.5E-01	--	--	na	8.5E-01
Dichlorobromomethane [C]	0	--	--	na	4.6E+02	--	--	na	5.1E+03	--	--	na	4.6E+01	--	--	na	5.1E+02	--	--	na	5.1E+02
1,2-Dichloroethane [C]	0	--	--	na	9.9E+02	--	--	na	1.1E+04	--	--	na	9.9E+01	--	--	na	1.1E+03	--	--	na	1.1E+03
1,1-Dichloroethylene	0	--	--	na	1.7E+04	--	--	na	1.0E+05	--	--	na	1.7E+03	--	--	na	1.0E+04	--	--	na	1.0E+04
1,2-trans-dichloroethylene	0	--	--	na	1.4E+05	--	--	na	8.4E+05	--	--	na	1.4E+04	--	--	na	8.4E+04	--	--	na	8.4E+04
2,4-Dichlorophenol	0	--	--	na	7.9E+02	--	--	na	4.7E+03	--	--	na	7.9E+01	--	--	na	4.7E+02	--	--	na	4.7E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	3.9E+02	--	--	na	4.3E+03	--	--	na	3.9E+01	--	--	na	4.3E+02	--	--	na	4.3E+02
1,3-Dichloropropene	0	--	--	na	1.7E+03	--	--	na	1.0E+04	--	--	na	1.7E+02	--	--	na	1.0E+03	--	--	na	1.0E+03
Dieldrin [C]	0	2.4E-01	5.6E-02	na	1.4E-03	9.5E-01	2.2E-01	na	1.5E-02	6.0E-02	1.4E-02	na	1.4E-04	2.4E-01	5.6E-02	na	1.5E-03	2.4E-01	5.6E-02	na	1.5E-03
Diethyl Phthalate	0	--	--	na	1.2E+05	--	--	na	7.2E+05	--	--	na	1.2E+04	--	--	na	7.2E+04	--	--	na	7.2E+04
Di-2-Ethylhexyl Phthalate [C]	0	--	--	na	5.9E+01	--	--	na	6.5E+02	--	--	na	5.9E+00	--	--	na	6.5E+01	--	--	na	6.5E+01
2,4-Dimethylphenol	0	--	--	na	2.3E+03	--	--	na	1.4E+04	--	--	na	2.3E+02	--	--	na	1.4E+03	--	--	na	1.4E+03
Dimethyl Phthalate	0	--	--	na	2.9E+06	--	--	na	1.7E+07	--	--	na	2.9E+05	--	--	na	1.7E+06	--	--	na	1.7E+06
Di-n-Butyl Phthalate	0	--	--	na	1.2E+04	--	--	na	7.2E+04	--	--	na	1.2E+03	--	--	na	7.2E+03	--	--	na	7.2E+03
2,4 Dinitrophenol	0	--	--	na	1.4E+04	--	--	na	8.4E+04	--	--	na	1.4E+03	--	--	na	8.4E+03	--	--	na	8.4E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	na	7.65E+02	--	--	na	4.6E+03	--	--	na	7.7E+01	--	--	na	4.6E+02	--	--	na	4.6E+02
2,4-Dinitrotoluene [C]	0	--	--	na	9.1E+01	--	--	na	1.0E+03	--	--	na	9.1E+00	--	--	na	1.0E+02	--	--	na	1.0E+02
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	na	1.2E-06	--	--	na	na	--	--	na	1.2E-07	--	--	na	1.2E-07	--	--	na	na
1,2-Diphenylhydrazine[C]	0	--	--	na	5.4E+00	--	--	na	5.9E+01	--	--	na	5.4E-01	--	--	na	5.9E+00	--	--	na	5.9E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	8.7E-01	2.2E-01	na	1.4E+03	5.5E-02	1.4E-02	na	2.4E+01	2.2E-01	5.6E-02	na	1.4E+02	2.2E-01	5.6E-02	na	1.4E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	8.7E-01	2.2E-01	na	1.4E+03	5.5E-02	1.4E-02	na	2.4E+01	2.2E-01	5.6E-02	na	1.4E+02	2.2E-01	5.6E-02	na	1.4E+02
Endosulfan Sulfate	0	--	--	na	2.4E+02	--	--	na	1.4E+03	--	--	na	2.4E+01	--	--	na	1.4E+02	--	--	na	1.4E+02
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	3.4E-01	1.4E-01	na	4.9E+00	2.2E-02	9.0E-03	na	8.1E-02	8.6E-02	3.6E-02	na	4.9E-01	8.6E-02	3.6E-02	na	4.9E-01
Endrin Aldehyde	0	--	--	na	8.1E-01	--	--	na	4.9E+00	--	--	na	8.1E-02	--	--	na	4.9E-01	--	--	na	4.9E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.9E+04	--	--	na	1.7E+05	--	--	na	2.9E+03	--	--	na	1.7E+04	--	--	na	1.7E+04
Fluoranthene	0	--	--	na	3.7E+02	--	--	na	2.2E+03	--	--	na	3.7E+01	--	--	na	2.2E+02	--	--	na	2.2E+02
Fluorene	0	--	--	na	1.4E+04	--	--	na	8.4E+04	--	--	na	1.4E+03	--	--	na	8.4E+03	--	--	na	8.4E+03
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	4.0E-02	na	--	--	2.5E-03	na	--	--	1.0E-02	na	--	--	1.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	2.1E-03	2.1E+00	1.5E-02	na	2.3E-02	1.3E-01	9.5E-04	na	2.1E-04	5.2E-01	3.8E-03	na	2.3E-03	5.2E-01	3.8E-03	na	2.3E-03
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	1.1E-03	2.1E+00	1.5E-02	na	1.2E-02	1.3E-01	9.5E-04	na	1.1E-04	5.2E-01	3.8E-03	na	1.2E-03	5.2E-01	3.8E-03	na	1.2E-03
Hexachlorobenzene[C]	0	--	--	na	7.7E-03	--	--	na	8.5E-02	--	--	na	7.7E-04	--	--	na	8.5E-03	--	--	na	8.5E-03
Hexachlorobutadiene[C]	0	--	--	na	5.0E+02	--	--	na	5.5E+03	--	--	na	5.0E+01	--	--	na	5.5E+02	--	--	na	5.5E+02
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	1.3E-01	--	--	na	1.4E+00	--	--	na	1.3E-02	--	--	na	1.4E-01	--	--	na	1.4E-01
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	4.6E-01	--	--	na	5.1E+00	--	--	na	4.6E-02	--	--	na	5.1E-01	--	--	na	5.1E-01
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	6.3E-01	3.8E+00	--	na	6.9E+00	2.4E-01	--	na	6.3E-02	9.5E-01	--	na	6.9E-01	9.5E-01	--	na	6.9E-01
Hexachlorocyclopentadiene	0	--	--	na	1.7E+04	--	--	na	1.0E+05	--	--	na	1.7E+03	--	--	na	1.0E+04	--	--	na	1.0E+04
Hexachloroethane[C]	0	--	--	na	8.9E+01	--	--	na	9.8E+02	--	--	na	8.9E+00	--	--	na	9.8E+01	--	--	na	9.8E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	8.0E+00	na	--	--	5.0E-01	na	--	--	2.0E+00	na	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	5.4E+00	--	--	na	4.9E-02	--	--	na	5.4E-01	--	--	na	5.4E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Isophorone[C]	0	--	--	na	2.6E+04	--	--	na	2.9E+05	--	--	na	2.6E+03	--	--	na	2.9E+04	--	--	na	2.9E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Lead	2.09	8.7E+01	9.9E+00	na	--	3.4E+02	3.3E+01	na	--	2.3E+01	4.0E+00	na	--	8.7E+01	9.9E+00	na	--	8.7E+01	9.9E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	4.0E-01	na	--	--	2.5E-02	na	--	--	1.0E-01	na	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Mercury	0.081	1.4E+00	7.7E-01	na	5.1E-02	5.3E+00	2.8E+00	na	-9.9E-02	4.1E-01	2.5E-01	na	7.8E-02	1.4E+00	7.7E-01	na	6.3E-02	1.4E+00	7.7E-01	na	-9.9E-02
Methyl Bromide	0	--	--	na	4.0E+03	--	--	na	2.4E+04	--	--	na	4.0E+02	--	--	na	2.4E+03	--	--	na	2.4E+03
Methoxychlor	0	--	3.0E-02	na	--	--	1.2E-01	na	--	--	7.5E-03	na	--	--	3.0E-02	na	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Monochlorobenzene	0	--	--	na	2.1E+04	--	--	na	1.3E+05	--	--	na	2.1E+03	--	--	na	1.3E+04	--	--	na	1.3E+04
Nickel	4.77	1.5E+02	1.6E+01	na	4.6E+03	5.7E+02	5.2E+01	na	2.8E+04	4.1E+01	7.7E+00	na	4.6E+02	1.5E+02	1.6E+01	na	2.8E+03	1.5E+02	1.6E+01	na	2.8E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Nitrobenzene	0	--	--	na	1.9E+03	--	--	na	1.1E+04	--	--	na	1.9E+02	--	--	na	1.1E+03	--	--	na	1.1E+03
N-Nitrosodimethylamine[C]	0	--	--	na	8.1E+01	--	--	na	8.9E+02	--	--	na	8.1E+00	--	--	na	8.9E+01	--	--	na	8.9E+01
N-Nitrosodiphenylamine[C]	0	--	--	na	1.6E+02	--	--	na	1.8E+03	--	--	na	1.6E+01	--	--	na	1.8E+02	--	--	na	1.8E+02
N-Nitrosodi-n-propylamine[C]	0	--	--	na	1.4E+01	--	--	na	1.5E+02	--	--	na	1.4E+00	--	--	na	1.5E+01	--	--	na	1.5E+01
Parathion	0	6.5E-02	1.3E-02	na	--	2.6E-01	5.2E-02	na	--	1.6E-02	3.3E-03	na	--	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--
PCB-1016	0	--	1.4E-02	na	--	--	5.6E-02	na	--	--	3.5E-03	na	--	--	1.4E-02	na	--	--	1.4E-02	na	--
PCB-1221	0	--	1.4E-02	na	--	--	5.6E-02	na	--	--	3.5E-03	na	--	--	1.4E-02	na	--	--	1.4E-02	na	--
PCB-1232	0	--	1.4E-02	na	--	--	5.6E-02	na	--	--	3.5E-03	na	--	--	1.4E-02	na	--	--	1.4E-02	na	--
PCB-1242	0	--	1.4E-02	na	--	--	5.6E-02	na	--	--	3.5E-03	na	--	--	1.4E-02	na	--	--	1.4E-02	na	--
PCB-1248	0	--	1.4E-02	na	--	--	5.6E-02	na	--	--	3.5E-03	na	--	--	1.4E-02	na	--	--	1.4E-02	na	--
PCB-1254	0	--	1.4E-02	na	--	--	5.6E-02	na	--	--	3.5E-03	na	--	--	1.4E-02	na	--	--	1.4E-02	na	--
PCB-1260	0	--	1.4E-02	na	--	--	5.6E-02	na	--	--	3.5E-03	na	--	--	1.4E-02	na	--	--	1.4E-02	na	--
PCB Total[C]	0	--	--	na	1.7E-03	--	--	na	1.9E-02	--	--	na	1.7E-04	--	--	na	1.9E-03	--	--	na	1.9E-03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Pentachlorophenol [C]	0	5.2E+00	4.0E+00	na	8.2E+01	2.1E+01	1.6E+01	na	9.0E+02	1.3E+00	1.0E+00	na	8.2E+00	5.2E+00	4.0E+00	na	9.0E+01	5.2E+00	4.0E+00	na	9.0E+01
Phenol	0	--	--	na	4.6E+06	--	--	na	2.8E+07	--	--	na	4.6E+05	--	--	na	2.8E+06	--	--	na	2.8E+06
Pyrene	0	--	--	na	1.1E+04	--	--	na	6.6E+04	--	--	na	1.1E+03	--	--	na	6.6E+03	--	--	na	6.6E+03
Radionuclides (pCi/l except Beta/Photon)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Gross Alpha Activity	0	--	--	na	1.5E+01	--	--	na	9.0E+01	--	--	na	1.5E+00	--	--	na	9.0E+00	--	--	na	9.0E+00
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	2.4E+01	--	--	na	4.0E-01	--	--	na	2.4E+00	--	--	na	2.4E+00
Strontium-90	0	--	--	na	8.0E+00	--	--	na	4.8E+01	--	--	na	8.0E-01	--	--	na	4.8E+00	--	--	na	4.8E+00
Tritium	0	--	--	na	2.0E+04	--	--	na	1.2E+05	--	--	na	2.0E+03	--	--	na	1.2E+04	--	--	na	1.2E+04
Selenium	0.828	2.0E+01	5.0E+00	na	1.1E+04	7.7E+01	1.8E+01	na	6.6E+04	5.6E+00	1.9E+00	na	1.1E+03	2.0E+01	5.0E+00	na	6.6E+03	2.0E+01	5.0E+00	na	6.6E+03
Silver	1.103	2.3E+00	--	na	--	5.7E+00	--	na	--	1.4E+00	--	na	--	2.3E+00	--	na	--	2.3E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,1,2,2-Tetrachloroethane [C]	0	--	--	na	1.1E+02	--	--	na	1.2E+03	--	--	na	1.1E+01	--	--	na	1.2E+02	--	--	na	1.2E+02
Tetrachloroethylene [C]	0	--	--	na	8.9E+01	--	--	na	9.8E+02	--	--	na	8.9E+00	--	--	na	9.8E+01	--	--	na	9.8E+01
Thallium	0	--	--	na	6.3E+00	--	--	na	3.8E+01	--	--	na	6.3E-01	--	--	na	3.8E+00	--	--	na	3.8E+00
Toluene	0	--	--	na	2.0E+05	--	--	na	1.2E+06	--	--	na	2.0E+04	--	--	na	1.2E+05	--	--	na	1.2E+05
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	7.5E-03	2.9E+00	8.0E-04	na	8.3E-02	1.8E-01	5.0E-05	na	7.5E-04	7.3E-01	2.0E-04	na	8.3E-03	7.3E-01	2.0E-04	na	8.3E-03
Tributyltin	0	4.6E-01	6.3E-02	na	--	1.8E+00	2.5E-01	na	--	1.2E-01	1.6E-02	na	--	4.6E-01	6.3E-02	na	--	4.6E-01	6.3E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	9.4E+02	--	--	na	5.6E+03	--	--	na	9.4E+01	--	--	na	5.6E+02	--	--	na	5.6E+02
1,1,2-Trichloroethane [C]	0	--	--	na	4.2E+02	--	--	na	4.6E+03	--	--	na	4.2E+01	--	--	na	4.6E+02	--	--	na	4.6E+02
Trichloroethylene [C]	0	--	--	na	8.1E+02	--	--	na	8.9E+03	--	--	na	8.1E+01	--	--	na	8.9E+02	--	--	na	8.9E+02
2,4,6-Trichlorophenol [C]	0	--	--	na	6.5E+01	--	--	na	7.2E+02	--	--	na	6.5E+00	--	--	na	7.2E+01	--	--	na	7.2E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Vinyl Chloride [C]	0	--	--	na	6.1E+01	--	--	na	6.7E+02	--	--	na	6.1E+00	--	--	na	6.7E+01	--	--	na	6.7E+01
Zinc	19.31	9.5E+01	9.6E+01	na	6.9E+04	3.2E+02	3.3E+02	na	4.1E+05	3.8E+01	3.8E+01	na	6.9E+03	9.5E+01	9.6E+01	na	4.1E+04	9.5E+01	9.6E+01	na	4.1E+04

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	2.6E+03
Arsenic	9.0E+01
Barium	na
Cadmium	5.6E-01
Chromium III	3.6E+01
Chromium VI	6.4E+00
Copper	4.3E+00
Iron	na
Lead	5.9E+00
Manganese	na
Mercury	-9.9E-02
Nickel	9.9E+00
Selenium	3.0E+00
Silver	9.1E-01
Zinc	3.8E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

0.100 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD 0.100

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.296	0.700	0.396	0.800
7Q10	0.300	N/A	0.400	N/A
30Q10	0.400	1.000	0.500	1.100
30Q5	0.500	N/A	0.600	N/A
Harm. Mean	1.000	N/A	1.100	N/A
Annual Avg.	0.000	N/A	0.100	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	22.521	16.088
30Q10 90th% Temp. Mix (deg C)	22.620	16.064
1Q10 90th% pH Mix (SU)	7.659	7.916
30Q10 90th% pH Mix (SU)	7.747	8.022
1Q10 10th% pH Mix (SU)	6.485	N/A
7Q10 10th% pH Mix (SU)	6.488	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	78.1	78.1
7Q10 Hardness (mg/L as CaCO3)	78.3	78.3

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.659
(7.204 - pH)	-0.455
(pH - 7.204)	0.455
Trout Present Criterion (mg N/l	10.326
Trout Absent Criterion (mg N/L	15.463
Trout Present?	n
Effective Criterion (mg N/L)	15.463

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	22.620
90th Percentile pH (SU)	7.747
MIN	1.690
MAX	22.620
(7.688 - pH)	-0.059
(pH - 7.688)	0.059
Early LS Present Criterion (mg N	2.011
Early LS Absent Criterion (mg N/	2.011
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.011

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.916
(7.204 - pH)	-0.712
(pH - 7.204)	0.712
Trout Present Criterion (mg N/l	6.566
Trout Absent Criterion (mg N/L	9.832
Trout Present?	n
Effective Criterion (mg N/L)	9.832

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	16.064
90th Percentile pH (SU)	8.022
MIN	2.580
MAX	16.064
(7.688 - pH)	-0.334
(pH - 7.688)	0.334
Early LS Present Criterion (mg N	2.133
Early LS Absent Criterion (mg N/	2.133
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.133

0.100 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGD 0.100

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.300	0.700	0.400	0.800
7Q10	0.300	N/A	0.400	N/A
30Q10	0.400	1.000	0.500	1.100
30Q5	0.500	N/A	0.600	N/A
Harm. Mean	1.000	N/A	1.100	N/A
Annual Avg.	0.000	N/A	0.100	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	22.525	16.088
30Q10 90th% Temp. Mix (deg C)	22.620	16.064
1Q10 90th% pH Mix (SU)	7.663	7.916
30Q10 90th% pH Mix (SU)	7.747	8.022
1Q10 10th% pH Mix (SU)	6.488	N/A
7Q10 10th% pH Mix (SU)	6.488	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	78.250	78.250
7Q10 Hardness (mg/L as CaCO3) =	78.250	78.250

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.663
(7.204 - pH)	-0.459
(pH - 7.204)	0.459
Trout Present Criterion (mg N/l	10.268
Trout Absent Criterion (mg N/L	15.374
Trout Present?	n
Effective Criterion (mg N/L)	15.374

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	22.620
90th Percentile pH (SU)	7.747
MIN	1.690
MAX	22.620
(7.688 - pH)	-0.059
(pH - 7.688)	0.059
Early LS Present Criterion (mg N	2.011
Early LS Absent Criterion (mg N/	2.011
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.011

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.916
(7.204 - pH)	-0.712
(pH - 7.204)	0.712
Trout Present Criterion (mg N/l	6.566
Trout Absent Criterion (mg N/L	9.832
Trout Present?	n
Effective Criterion (mg N/L)	9.832

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	16.064
90th Percentile pH (SU)	8.022
MIN	2.580
MAX	16.064
(7.688 - pH)	-0.334
(pH - 7.688)	0.334
Early LS Present Criterion (mg N	2.133
Early LS Absent Criterion (mg N/	2.133
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.133

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Facility = Falling Creek WFP
Chemical = copper, dissolved (ug/L)
Chronic averaging period = 4
WLAa = 3.6
WLAc = 2.7
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1000
Variance = 360000
C.V. = 0.6
97th percentile daily values = 2433.41
97th percentile 4 day average = 1663.79
97th percentile 30 day average= 1206.05
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 3.6
Average Weekly limit = 3.6
Average Monthly LImit = 3.6

The data are:

1000

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Facility = Falling Creek WFP
Chemical = TRC (mg/L)
Chronic averaging period = 4
WLAa = 0.019
WLAc = 0.011
Q.L. = 0.01
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1000
Variance = 360000
C.V. = 0.6
97th percentile daily values = 2433.41
97th percentile 4 day average = 1663.79
97th percentile 30 day average= 1206.05
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.60883226245855E-02
Average Weekly limit = 1.60883226245855E-02
Average Monthly LImit = 1.60883226245855E-02

The data are:

1000

Attachment I

Whole Effluent Toxicity Evaluation

- **Whole Effluent Toxicity Testing Review Memorandum**
- **WETLIM10 Spreadsheet**
- **STATS Program Outputs (TU_c)**

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road Roanoke, VA 24019

SUBJECT: WET Testing Limit Justification for Falling Creek Water Filtration Plant
VPDES Permit No. VA0001465

TO: Permit File

FROM: Becky L. France, Environmental Engineer Senior

DATE: April 13, 2009

INTRODUCTION:

The Western Virginia Water Authority operates Falling Creek Water Filtration Plant, which produces potable water for Vinton, Stewartsville, parts of Botetourt County, and a portion of southeast Roanoke City. Table 1 summarizes the facility information. The permit for this facility was reissued on August 27, 2004, and includes a Toxics Management Program (TMP) for outfall 001, which is also summarized in Table 1. A Whole Effluent Toxicity Limit of 1.44 TU_c was effective August 27, 2008.

TOXICITY EVALUATION / DISCUSSION:

Tables 2 includes a compilation of the chronic toxicity testing data since February of 2005. For outfall 001, the facility has data for nine valid toxicity testing events. The facility passed all four of the chronic toxicity tests using C. dubia. The facility failed one of the five of the chronic toxicity tests for P. promelas.

Guidance Memorandum 00-2012 designates criteria to allow testing of only one species per test type rather than two species. The criteria designate one of two conditions that need to be met: (1) the average percent survival in 100% effluent for all the acceptable acute tests during a permit term with a particular species is $\geq$ 100, or (2) the average percent survival in 100% effluent for all of the acceptable chronic tests during a permit term with a particular species is $\geq$ 80% and the secondary endpoint for reproduction or growth is an NOEC=100%. For all the chronic testing with C. dubia, percent survival was 90% or greater and the NOECs were 100%. Since toxicity was associated with P. promelas rather than C. dubia, chronic testing will no longer be required for C. dubia. The chronic limit of 1.44 TU_c shall be continued from the previous permit. The monitoring frequency will increase to 1/quarter in accordance with the recommended frequency in the VPDES Permit Manual.

Calculations for the current chronic toxicity limit are included in the attached information. To determine the limit, chronic data for each species were input into the WETLIM10 spreadsheet to calculate a wasteload allocation. The chronic toxicity test data were entered into the STATS program along with the chronic wasteload allocation. The calculated limit was converted to an NOEC (100/TU_c), and then rounded up to the nearest whole number. Each TU_c was back calculated from the rounded NOEC (100/NOEC). In accordance with Agency guidance, the limit has been expressed with two decimal places.

Table 1. **FACILITY INFORMATION**

FACILITY: Falling Creek WFP

LOCATION: Laurel Glen Road (State Route 651), Bedford County, VA

VPDES #: VA0001465 Expiration Date: August 27, 2009

SIC CODE/DESCRIPTION: 4941 / Produced potable water from raw water source (Falling Creek). Discharge results from the backwash of solids from the sand filter and cleanout of the raw water sedimentation basins.

OUTFALLS/FLOWS (MGD): Outfall 001 = 0.134 MGD (maximum 30 day flow) 2004 application

WASTEWATER AND TREATMENT:

The facility treats in two settling basins operated in series to allow for settling of solids and dissipation of chlorine. Solids are disposed of at the POTW.

RECEIVING STREAM/CRITICAL FLOWS/IWC:

Receiving Stream:	Falling Creek	1Q10 = 0.0 MGD
River Basin:	Roanoke River	7Q10 = 0.0 MGD
Section:	6a	30Q5 = 0.0 MGD
Class:	III	Harmonic mean = 0.0 MGD
Special Standards:	NEW-1	

IWC = 100 %

TMP REQUIREMENTS (8/04-8/09):

Biological - Within 1 month of the effective date of the limit, semiannual chronic toxicity testing using Ceriodaphnia dubia and Pimephales promelas on 24-hour flow weighted composite samples. The chronic C. dubia test shall be a 3-brood survival and reproduction test, and the chronic P. promelas test shall be a 7-day larval survival and growth test.

TESTING LABORATORIES:

Olver Laboratories
REI Consultants, Inc., Beaver, WV

TOXICITY TEST DATA

Table 2. Chronic Toxicity Test Results; Falling Creek WFP, VA0001465, Outfall 001

Test Date (month/year)	Test Organism	TU_c	NOEC Survival %	NOEC Growth/ Reproduction %	% Survival in 100% effluent
2/2005	C. dubia	1.0	100	100	90
	P. promelas	1.20	100	83.4	87.5
8/2005	C. dubia	Invalid	--	--	--
	P. promelas	Invalid	--	--	--
12/2005	C. dubia	1.0	100	100	100
	P. promelas	1.0	100	100	97.5
10/2008	C. dubia	1.0	100	100	100
	P. promelas	**>5.88**	100	<17	97.5
	P. promelas	1.18	85	85	0
3/2009	C. dubia	1.0	100	100	90
	P. promelas	1.18	100	85	100

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 12/05/01
File: WETLIM10.xls
(MIX.EXE required also)

Acute Endpoint/Permit Limit — Use as LC_{50} in Special Condition, as TUa on DMR

ACUTE	100% /	NOAEC	LC_{50} =	NA	% Use as	NA TUa
ACUTE WLAa		0.3	Note: Inform the permittee that if the mean of the data exceeds this TUa:	1.0	a limit may result using WLA.EXE	

Chronic Endpoint/Permit Limit — Use as NOEC in Special Condition, as TUc on DMR

CHRONIC	1.462574684	TU_c	NOEC =	69	% Use as	1.44	TU_c
BOTH*	3.000000074	TU_c	NOEC =	34	% Use as	2.94	TU_c
AML	1.462574684	TU_c	NOEC =	69	% Use as	1.44	TU_c

ACUTE WLAa,c	3	Note: Inform the permittee that if the mean of the data exceeds this TUc:	1.0
CHRONIC WLAc	1	a limit may result using WLA.EXE	

* Both means acute expressed as chronic

Enter data in the cells with blue type:

Entry Date:	05/05/04		
Facility Name:	Falling Creek WTP		
VPDES Number:	VA0001465		
Outfall Number:	001		
Plant Flow:	0.134	MGD	
Acute 1Q10:	0	MGD	100 %
Chronic 7Q10:	0	MGD	100 %

% Flow to be used from MIX.EXE

Difuser /modeling study?

Enter Y/N	n	
Acute	1	:1
Chronic	1	:1

Are data available to calculate CV? (Y/N)	N	(Minimum of 10 data points, same species, needed)
Are data available to calculate ACR? (Y/N)	N	(NOEC<LC50, do not use greater/less than data)

Go to Page 2
Go to Page 3

IWC_a	100 %	Plant flow/plant flow + 1Q10	NOTE: If the IWCa is >33%, specify the
IWC_c	100 %	Plant flow/plant flow + 7Q10	NOAEC = 100% test/endpoint for use
Dilution, acute	1	100/IWCa	
Dilution, chronic	1	100/IWCc	
WLA_a	0.3	Instream criterion (0.3 TUa) X's Dilution, acute	
WLA_c	1	Instream criterion (1.0 TUc) X's Dilution, chronic	
$WLA_{a,c}$	3	ACR X's WLA_a - converts acute WLA to chronic units	
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)	
CV-Coefficient of variatio	0.6	Default of 0.6 - if data are available, use tables Page 2)	
Constants eA	0.4109447	Default = 0.41	
eB	0.6010373	Default = 0.3)	
eC	2.4334175	Default = 2 43	
eD	2.4334175	Default = 2.43 (1 samp)	

**The Maximum Daily Limit is calcufated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.

$LTA_{a,c}$	1.2328341	WLAa,c X's eA				
LTA_c	0.6010373	WLAc X's eB				
MDL** with $LTA_{a,c}$	3.00000007	TU_c	NOEC =	33.333333	(Protects from acute/chronic toxicity)	
MDL** with LTA_c	1.46257468	TU_c	NOEC =	68.372577	(Protects from chronic toxicity)	
AML with lowest LTA	1.46257468	TU_c	NOEC =	68.372577	Lowest LTA X's eD	

Rounded NOEC's		%
NOEC =	34	%
NOEC =	69	%
NOEC =	69	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

MDL with $LTA_{a,c}$	0.30000001	TU_a	LC50 =	333.333325	%	Use NOAEC=100%	
MDL with LTA_a	0.14625747	TU_a	LC50 =	683.725769	%	Use NOAEC=100%	

Rounded LC50's		%
LC50 =	NA	%
LC50 =	NA	

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.55451303

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.8892967

eA = 0.41094469

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.0861777

δ_4 = 0.29356038

B = -0.5090982

eB = 0.60103733

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.55451303

C = 0.88929666

eC = 2.43341753

Using the log variance to develop eD

(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.55451303

D = 0.88929666

eD = 2.43341753

	Vertebrate IC_{25} Data or LC_{50} Data **********			Invertebrate IC_{25} Data or LC_{50} Data **********	
		LN of data			LN of data
1	0		1	0	
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	100	1.0		
Dilution series to use for limit			69	1.4492754
Dilution factor to recommend:	0.5		0.8306624	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	83.1	1.20
	25.0	4.00	69.0	1.45
	12.5	8.00	57.3	1.74
	6.25	16.00	47.6	2.10
Extra dilutions if needed	3.12	32.05	39.5	2.53
	1.56	64.10	32.9	3.04

Table 3. Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here:

NO DATA	$\%LC_{50}$	
NO DATA	TUa	

Cell: I9
Comment:

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

6/8/04 5:05:32 PM

Facility = Falling Creek WFP
Chemical = WET (T.U.) C. dubia
Chronic averaging period = 4
WLAa =
WLAc = 1
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 4
Expected Value = 1.75
Variance = 1.1025
C.V. = 0.6
97th percentile daily values = 4.25848
97th percentile 4 day average = 2.91163
97th percentile 30 day average= 2.11059
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.46257478405323
Average Weekly limit = 1.46257478405323
Average Monthly LImit = 1.46257478405323

The data are:

4
1
1
1

6/8/04 5:07:33 PM

Facility = Falling Creek WFP
Chemical = WET (T.U.) P. promelas
Chronic averaging period = 4
WLAa =
WLAc = 1
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 7
Expected Value = 1.14285
Variance = .470204
C.V. = 0.6
97th percentile daily values = 2.78104
97th percentile 4 day average = 1.90147
97th percentile 30 day average= 1.37834
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.46257478405323
Average Weekly limit = 1.46257478405323
Average Monthly LImit = 1.46257478405323

The data are:

2
1
1
1
1
1
1

France,Becky

From: DeBiasi,Deborah
Sent: Friday, May 14, 2004 1:47 PM
To: France,Becky
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

I should have rerun STATs before I sent you my recommendation - sorry about that. It does call for a limit still. I would use NOEC 69%, or a 1.44 TUc. With them going into a "O" flow receiving stream, there isn't much slack given in the statistics.

Most WET limits have a quarterly frequency - I don't see this permittee as a problem and would entertain going with semiannual testing. The comments on the parallel testing if using the UV treatment still apply.

-----Original Message-----
From: France,Becky
Sent: Friday, May 14, 2004 11:59 AM
To: DeBiasi,Deborah
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

Thanks, that was very helpful. Based on evaluation of the statistics using the 1999 data and excluding the 5/00 test, the STATS program yields a chronic limit of 1.45 T.U. Data results for all tests are on previous fax. Should this limit be included in the permit?

-----Original Message-----
From: DeBiasi,Deborah
Sent: Friday, May 14, 2004 11:54 AM
To: France,Becky
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

The lab screwed up then - if pathogens are suspected, then parallel tests are to be set up to confirm it (chronic manual, section 11, starts on page 53). What I have seen happen with one effluent was that survival improved but growth got worse with UV treatment, so you need to be able to compare the treated effluent with the untreated before allowing for sample alteration.

My inclination is this:

Because of the extreme variability in the test 5/00, I don't feel confident that it is conclusively showing toxicity. The inverse dose response is of concern, but would appear to not be representative of the effluent overall.

I would recommend continuing annual toxicity testing with the understanding that UV sample treatment is allowed ONLY if parallel tests are run, including all dilutions, to confirm that the pathagen problem exists/persists. In lieu of UV sample treatment, the test may be run using more test chambers/fewer organisms (instead of 4 with 10, maybe go to 8 with 5, or 10 with 4), as long as there is a minimum of 40 organisms per dilution.

-----Original Message-----
From: France,Becky
Sent: Friday, May 14, 2004 11:10 AM
To: DeBiasi,Deborah
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

I have just sent test data from one of them. Unfortunately it appears that they only ran the test with treated dilutions and there are no untreated dilutions only treated and untreated controls. Please see the method description in the fax that has just transmitted.

-----Original Message-----
From: DeBiasi,Deborah
Sent: Friday, May 14, 2004 10:14 AM
To: France,Becky
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

I understand that the 2 failed tests did not have side by side treated/untreated dilutions. I understand that the other tests were NOEC = 100%. What I would still like to see is test data from a test where the treated/untreated dilutions (in addition to the treated/untreated controls) were run. If you would, Fax me the data for one of them.

-----Original Message-----
From: France,Becky
Sent: Friday, May 14, 2004 10:08 AM
To: DeBiasi,Deborah
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

For the two testing events that they failed in 11/99 and 8/00 the lab did not run side by side tests. For the test run begining on 8/00 side by side tests were run. But, there was no significant difference between the UV treated control and the non-UV treated control and the NOECs for the tests were 100% for the test beginning on 8/00.

-----Original Message-----
From: DeBiasi,Deborah
Sent: Friday, May 14, 2004 10:03 AM
To: France,Becky
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

What I'm interested in is that the lab should have run side by side tests, one with untreated effluent, and one with UV treated effluent to see what difference it made with the various dilutions.

-----Original Message-----
From: France,Becky
Sent: Friday, May 14, 2004 10:01 AM
To: DeBiasi,Deborah
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

The last four acute and chronic tests beginning with 8/00 (after the 5/00 failure) used UV disinfection and no further toxicity problems have occurred. However, there appeared to be no significant difference between the control and the UV disinfected control in any of the last four tests. A listing of the test results is on the previously sent fax.

Based upon the STATS program it appears this facility will need a chronic limit in their permit which I don't think they will have any problems meeting.

-----Original Message-----
From: DeBiasi,Deborah
Sent: Friday, May 14, 2004 9:34 AM
To: France,Becky
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

How about for the tests after that point, when they did start to use the UV disinfection?

-----Original Message-----
From: France,Becky
Sent: Friday, May 14, 2004 8:31 AM
To: DeBiasi,Deborah
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

Thanks for the evaluation. They did not use UV disinfection in the 11/99 or the 5/00 test so there are no side by side tests to compare.

-----Original Message-----
From: DeBiasi,Deborah
Sent: Thursday, May 13, 2004 5:25 PM
To: France,Becky
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

The data for the chronic *Ceriodaphnia dubia* test and the chronic *Pimephales promelas* on 11/99 show toxicity and no signs of pathogens that I can see.

The data for the chronic *Pimephales promelas* test on 5/00 is interesting in that it shows both inverse dose toxicity, and probable pathogen problems. It is also odd that the full strength effluent showed the least problems of any of the test chambers, including the controls. It is more usual to see variability increase as the concentrations increase, instead of this result.

<< OLE Object: Microsoft Excel Worksheet >>

<< OLE Object: Microsoft Excel Chart >>

Did the lab run side-by-side tests in the beginning to see what differences could be seen with treated and untreated effluent? If so, how did those results look for both the growth endpoint, and for survival?

-----Original Message-----
From: France,Becky
Sent: Thursday, May 13, 2004 11:29 AM
To: DeBiasi,Deborah
Subject: Evaluation of Toxicity Testing Results -- Falling Creek WTP

I am currently working on a reissuance for Falling Creek Water Filter Plant and I would like some advice on evaluating toxicity data for limits. The receiving stream for this facility is intermittent so the NOEC criteria in the current permit is 100%. The facility has experienced a couple instances of toxicity that they suspect may be attributed to pathogens rather than toxicity to a chemical toxicant. The facility withdraws their raw water from Falling Creek Reservoir. The last four acute and chronic tests beginning with 8/00 used UV disinfection and no further toxicity problems have occurred. However, there appeared to be no significant difference between the control and the UV disinfected control in any of the last four tests.

For two of the testing events, the effluent failed one or more of the toxicity tests as follows:

The toxicity test conducted in November of 1999 exhibited chronic toxicity to Ceriodaphnia and fathead minnows. No acute toxicity was noted. The NOEC for Ceriodaphnia was 25% and the NOEC for fathead minnow was 50%. The responses appear to be continuous. Dilutions were 6.25%, 12.5%, 25%, 50%, 100%.

The toxicity test conducted in May of 2000 exhibited chronic toxicity for fathead minnows at the 6.25% concentration but no other concentrations. Survival was significantly affected in the 6.25% effluent concentration. The NOEC has been given as < 6.25%. The data analysis was also performed on the fathead minnor growth data by including all effluent test concentrations in evaluation of effluent toxicity effects on test organism growth. The results showed no significant reduction in fathead minnor growth in any effluent in any effluent test concentration. Chronic exposure to the effluent did not significantly affect the survival or reproduciton of the Ceriodaphnia. The consulting lab noted that the toxicity could be due to pathogens or certain toxic chemical constituents.

DMR data during the permit term looks good with total suspended solids well below their limits and pH within limited parameters. The last four toxicity tests exhibited no toxicity problems. I understand that we no longer use the criteria allowing the permittee to pass 75% of the toxicity tests. Using the failed fathead minnow data on 11/99 and 6 other data points of 1.0 T.U. results in a limit. I have a copy of the raw data for the failed testing events if you would like to look at it. Based upon the STATS program it appears this facility will need a chronic limit in their permit which I don't think they will have any problems meeting. But, it is a little troublesome that there is not a clear cause-effect relationship to link the toxicity test results with a problem at the facility. I know the permittee will question a WET limit, so I wanted to discuss the data with you first. Any insights you have will be appreciated.

France,Becky

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Sent: Thursday, May 13, 2004 5:25 PM
To: France,Becky
Subject: RE: Evaluation of Toxicity Testing Results -- Falling Creek WTP

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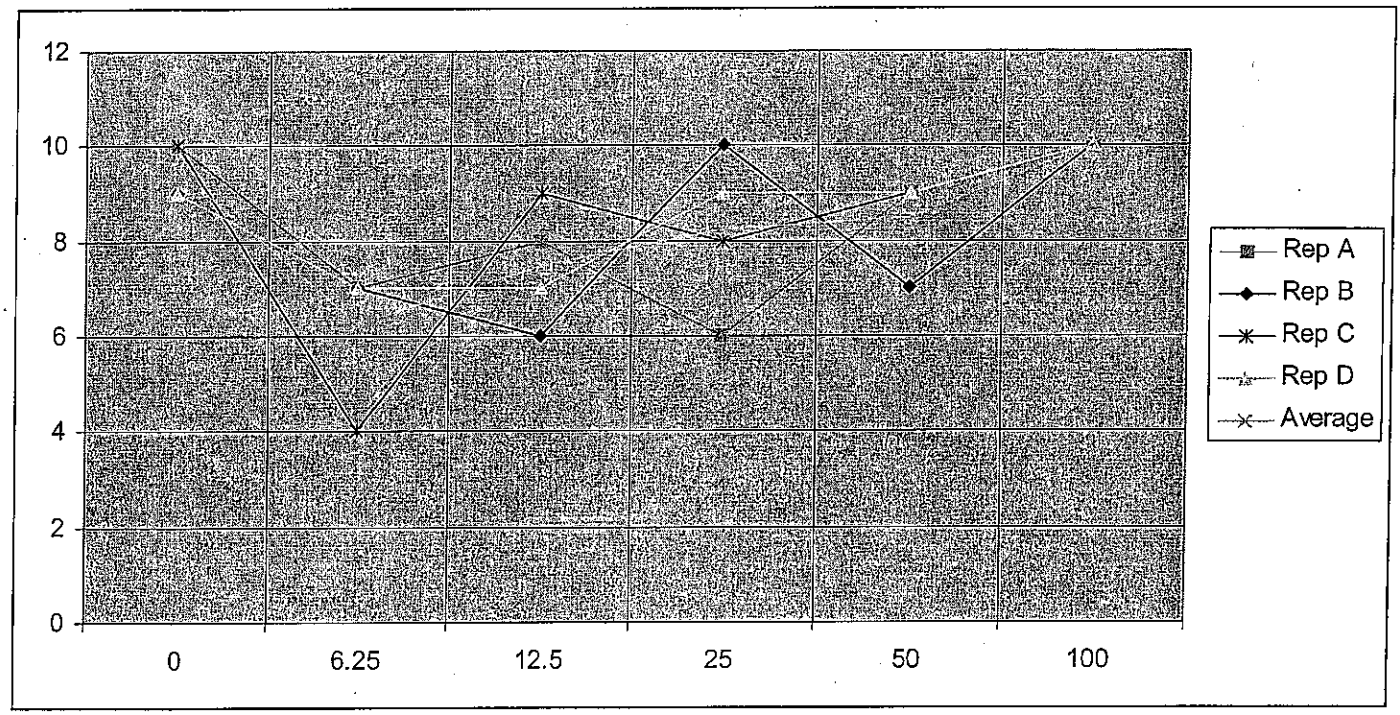
The data for the chronic *Pimephales promelas* test on 5/00 is interesting in that it shows both inverse dose toxicity, and probable pathogen problems. It is also odd that the full strength effluent showed the least problems of any of the test chambers, including the controls. It is more usual to see variability increase as the concentrations increase, instead of this result.

	0	6.25	12.5	25	50	100
Rep A	10	7	8	6	9	10
Rep B	9	7	6	10	7	10
Rep C	10	4	9	8	9	10
Rep D	9	7	7	9	9	10
AVE	9.5	6.25	7.5	8.25	8.5	10



Did the lab run side-by-side tests in the beginning to see what differences could be seen with treated and untreated effluent? If so, how did those results look for both the growth endpoint, and for survival?

-----Original Message-----
From: France,Becky
Sent: Thursday, May 13, 2004 11:29 AM
To: DeBiasi,Deborah
Subject: Evaluation of Toxicity Testing Results -- Falling Creek WTP

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However, there appeared to be no significant difference between the control and the UV disinfected control in any of the last four tests.

For two of the testing events, the effluent failed one or more of the toxicity tests as follows:

The toxicity test conducted in November of 1999 exhibited chronic toxicity to Ceriodaphnia and fathead minnows. No acute toxicity was noted. The NOEC for Ceriodaphnia was 25% and the NOEC for fathead minnow was 50%. The responses appear to be continuous. Dilutions were 6.25%, 12.5%, 25%, 50%, 100%.

The toxicity test conducted in May of 2000 exhibited chronic toxicity for fathead minnows at the 6.25% concentration but no other concentrations. Survival was significantly affected in the 6.25% effluent concentration. The NOEC has been given as < 6.25%. The data analysis was also performed on the fathead minnor growth data by including all effluent test concentrations in evaluation of effluent toxicity effects on test organism growth. The results showed no significant reduction in fathead minnor growth in any effluent in any effluent test concentration. Chronic exposure to the effluent did not significantly affect the survival or reproduciton of the Ceriodaphnia. The consulting lab noted that the toxicity could be due to pathogens or certain toxic chemical constituents.

DMR data during the permit term looks good with total suspended solids well below their limits and pH within limited parameters. The last four toxicity tests exhibited no toxicity problems. I understand that we no longer use the criteria allowing the permittee to pass 75% of the toxicity tests. Using the failed fathead minnow data on 11/99 and 6 other data points of 1.0 T.U. results in a limit. I have a copy of the raw data for the failed testing events if you would like to look at it. Based upon the STATS program it appears this facility will need a chronic limit in their permit which I don't think they will have any problems meeting. But, it is a little troublesome that there is not a clear cause-effect relationship to link the toxicity test results with a problem at the facility. I know the permittee will question a WET limit, so I wanted to discuss the data with you first. Any insights you have will be appreciated.

Attachment J

NPDES Permit Rating Worksheet

NPDES PERMIT RATING WORK SHEET

NPDES NO. VA0001465

☐ Regular Addition
☐ DiscretionaryAddition
☐ Score change, but no status change
☐ Deletion
☒ Score change, status change

Facility Name: **Falling Creek WFP**

City: Roanoke, Virginia

Receiving Water: Falling Creek

Reach Number: _____

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?
1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate
☐ YES; score is 600 (stop here) ☒ NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

☐ YES; score is 700 (stop here)
☒ NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: _____ Primary SIC Code: 4941 Other SIC Codes: _____
Industrial Subcategory Code: 0 (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	15	☒ 7.	7	35
☐ 1.	1	5	☐ 4.	4	20	☐ 8.	8	40
☐ 2.	2	10	☐ 5.	5	25	☐ 9.	9	45
			☐ 6.	6	30	☐ 10.	10	50

Code Number Checked: 7

Total Points Factor 1: 35

FACTOR 2: Flow/Stream Flow Volume (*Complete either Section A or Section B; check only one)*

Section A ☐ Wastewater Flow Only Considered

Wastewater Type (See Instructions)		Code	Points
Type I: Flow < 5 MGD	☐	11	0
Flow 5 to 10 MGD	☐	12	10
Flow > 10 to 50 MGD	☐	13	20
Flow > 50 MGD	☐	14	30
Type II: Flow < 1 MGD	☒	21	10
Flow 1 to 5 MGD	☐	22	20
Flow > 5 to 10 MGD	☐	23	30
Flow > 10 MGD	☐	24	50
Type III: Flow < 1 MGD	☐	31	0
Flow 1 to 5 MGD	☐	32	10
Flow > 5 to 10 MGD	☐	33	20
Flow > 10 MGD	☐	34	30

Section B ☐ Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10 %	☐	41	0
	10 % to < 50 %	☐	42	10
	> 50 %	☐	43	20
Type II:	< 10 %	☐	51	0
	10 % to <50 %	☐	52	20
	> 50 %	☐	53	30

Code Checked from Section A or B: 21
Total Points Factor 2: 10

FACTOR 3: Conventional Pollutants NPDES NO: **VA0001465**

(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) ☐ BOD ☐ COD ☐ Other:_____

			Code	*Points*
Permit Limits: (check one)	☐	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	☐	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Code Checked: NA

Points Scored: 0

B. Total Suspended Solids (TSS)

			Code	*Points*
Permit Limits: (check one)	■	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	☐	> 1000 to 5000 lbs/day	3	15
	☐	> 5000 lbs/day	4	20

Code Checked: 1

Points Scored: 0

C. Nitrogen Pollutant: (check one) ☐ Ammonia ☐ Other: _____

		Nitrogen Equivalent	*Code*	*Points*
Permit Limits: (check one)	☐	< 300 lbs/day	1	0
	☐	300 to 1000 lbs/day	2	5
	☐	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Code Checked: NA

Points Scored: 0

Total Points Factor 3: 0

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

■ YES (If yes, check toxicity potential number below)

☐ NO (If no, go to Factor 5)

Determine the *human health* toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column ☐ check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	0	■ 7.	7	15
☐ 1.	1	0	☐ 4.	4	0	☐ 8.	8	20
☐ 2.	2	0	☐ 5.	5	5	☐ 9.	9	25
			☐ 6.	6	10	☐ 10.	10	30

Code Number Checked: 07

Total Points Factor 4: 15

FACTOR 5: Water Quality Factors

NPDES NO. VA0001465

A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge:

		Code	Points
☒	Yes	1	10
☐	No	2	0

B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

		Code	Points
☐	Yes	1	0
☒	No	2	5

C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?

		Code	Points
☒	Yes	1	10
☐	No	2	0

Code Number Checked: A 1 B 1 C 1

Points Factor 5: A 10 + B 5 + C 10 = 25 TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. Base Score: Enter flow code here (from Factor 2): 21

Enter the multiplication factor that corresponds to the flow code: 0.10

Check appropriate facility HPRI Code (from PCS):

	HPRI#	*Code*	*HPRI Score*
☐	1	1	20
☐	2	2	0
☐	3	3	30
☒	4	4	0
☐	5	5	20

HPRI code checked: ___

Flow Code	*Multiplication Factor*
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

Base Score: (HPRI Score) 0 X (Multiplication Factor) 0.1 = 0 (TOTAL POINTS)

B. Additional Points ☐ NEP Program
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

	Code	Points
☐ Yes	1	10
☒ No	2	0

C. Additional Points ☐ Great Lakes Area of Concern
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see Instructions)

	Code	Points
☐ Yes	1	10
☒ No	2	0

Code Number Checked: A 4 B 2 C 2

Points Factor 6: A 0 + B 0 + C 0 = 0 TOTAL

SCORE SUMMARY NPDES NO. VA0001465

Factor	Description	Total Points
1	Toxic Pollutant Potential	35
2	Flows/Streamflow Volume	20
3	Conventional Pollutants	0
4	Public Health Impacts	15
5	Water Quality Factors	25
6	Proximity to Near Coastal Waters	0
	TOTAL (Factors 1 through 6)	95

S1. Is the total score equal to or greater than 80? ■ Yes (Facility is a major) ☐ No

S2. If the answer to the above questions is no, would you like this facility to be a discretionary major?

■ No

☐ Yes (Add 500 points to the above score and provide reason below:

Reason:

NEW SCORE: 95

OLD SCORE: 70

Becky L. France
Permit Reviewer's Name

(540) 562-6700
Phone Number

4/6/09
Date

Attachment J

Public Notice

PUBLIC NOTICE – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Bedford County.
PUBLIC COMMENT PERIOD: 30 days following the public notice issue date; comment period ends 4:30 pm of last day
PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board
APPLICANT NAME, ADDRESS, AND PERMIT NUMBER: Western Virginia Water Authority, 601 Jefferson Street, Suite 200, Roanoke, VA 24011, VA0001465
FACILITY NAME AND LOCATION: Falling Creek Water Filtration Plant, 3031 Laurel Glen Road, Vinton, VA 24179
PROJECT DESCRIPTION: Falling Creek Water Filtration Plant has applied for a reissuance of a permit for the public water treatment plant in Bedford County. The applicant proposes to release industrial wastewater from the production of potable water at a rate of 0.100 MGD from the current facility into a water body. The facility proposes to release industrial wastewater into Falling Creek in the Roanoke River/Smith Mountain Lake/Beaverdam Creek Watershed (VAW-L0R). A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: solids
HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments by e-mail, fax, or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for a public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. DEQ may hold a public hearing, including another comment period, if a public response is significant and there are substantial, disputed issues relevant to the permit
CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS, AND ADDITIONAL INFORMATION:
NAME: Becky L. France; ADDRESS: Virginia Department of Environmental Quality, Blue Ridge Regional Office, 3019 Peters Creek Road, Roanoke, VA 24019-2738; PHONE: (540) 562-6700; E-MAIL ADDRESS: blfrance@deq.virginia.gov; FAX: (540) 562-6725. The public may review the draft permit and application at the DEQ office named above by appointment.

Attachment K

EPA Checksheet

Revised 2/2003

State "FY2003 Transmittal Checklist" to Assist in Targeting Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Falling Creek WFP

NPDES Permit Number: VA0001465

Permit Writer Name: Becky L. France

Date: 4/16/09

Major [ ] **Minor [X]** **Industrial [X]** **Municipal [ ]**

I.A. Draft Permit Package Submittal Includes:	Yes	No	N/A
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?			X
6. A Reasonable Potential analysis showing calculated WQBELs?			X
7. Dissolved Oxygen calculations?		X	
8. Whole Effluent Toxicity Test summary and analysis?	X		
9. Permit Rating Sheet for new or modified industrial facilities?	X		

I.B. Permit/Facility Characteristics	Yes	No	N/A
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	X		

I.B. Permit/Facility Characteristics – cont. (FY2003)	Yes	No	N/A
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed? (for the perennial section)	X		
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?		X	
a. Has a TMDL been developed and approved by EPA for the impaired water?			X
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?			X
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		X	
10. Does the permit authorize discharges of storm water?		X	
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?	X		
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?			X
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist (FY2003)

Region III NPDES Permit Quality Review Checklist – For Non-Municipals

(To be completed and included in the record for all non-POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet **or** permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?	X		

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ)	Yes	No	N/A
1. Is the facility subject to a national effluent limitations guideline (ELG)?		X	
a. If yes, does the record adequately document the categorization process, including an evaluation of whether the facility is a new source or an existing source?			X
b. If no, does the record indicate that a technology-based analysis based on Best Professional Judgement (BPJ) was used for all pollutants of concern discharged at treatable concentrations?	X		
2. For all limits developed based on BPJ, does the record indicate that the limits are consistent with the criteria established at 40 CFR 125.3(d)?	X		
3. Does the fact sheet adequately document the calculations used to develop both ELG and /or BPJ technology-based effluent limits?	X		
4. For all limits that are based on production or flow, does the record indicate that the calculations are based on a "reasonable measure of ACTUAL production" for the facility (not design)?			X
5. Does the permit contain "tiered" limits that reflect projected increases in production or flow?		X	
a. If yes, does the permit require the facility to notify the permitting authority when alternate levels of production or flow are attained?			X
6. Are technology-based permit limits expressed in appropriate units of measure (e.g., concentration, mass, SU)?	X		

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ) – cont.	Yes	No	N/A
7. Are all technology-based limits expressed in terms of both maximum daily, weekly average, and/or monthly average limits?	X		
8. Are any final limits less stringent than required by applicable effluent limitations guidelines or BPJ?		X	

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the record indicate that any WQBELs were derived from a completed and EPA approved TMDL?			X
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations where data are available)?			X
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term (e.g., average monthly) AND short-term (e.g., maximum daily, weekly average, instantaneous) effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the fact sheet indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements (FY2003)	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			X
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require testing for Whole Effluent Toxicity in accordance with the State's standard practices?	X		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit require development and implementation of a Best Management Practices (BMP) plan or site-specific BMPs?		X	
a. If yes, does the permit adequately incorporate and require compliance with the BMPs?			X
2. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
3. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

List of Standard Conditions – 40 CFR 122.41

Duty to comply
Duty to reapply
Need to halt or reduce activity not a defense
Duty to mitigate
Proper O & M
Permit actions
Property rights
Duty to provide information
Inspections and entry
Monitoring and records
Signatory requirement
Bypass
Upset
Reporting Requirements
Planned change
Anticipated noncompliance
Transfers
Monitoring reports
Compliance schedules
24-Hour reporting
Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for existing non-municipal dischargers regarding pollutant notification levels [40 CFR 122.42(a)]?	X		

Part III. Signature Page (FY2003)

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Becky L. France
Title	Environmental Engineer Senior
Signature	Becky L France
Date	4/6/09